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MELBOURNE AUSTRALIA

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Front cover : Castiarina burnsi (Barker) was named after Mr Gordon Burns in recognition of his enormous contribution to the study of burprestid beetles. The species occurs in the Big and Little Deserts in Victoria and Gawler in South Australia. Illustration by Graham Milledge.

Occasional Papers from the Museum of Victoria

The Museum of Victoria was formed in 1983 by the merger of the National Museum of Victoria (established in 1854) and the Science Museum of Victoria (established in 1870). Among the Museum's objectives are scholarship and education in the fields of natural history, science and technology, and history of human society. The Museum of Victoria publishes two scientific serials to further these objectives, *Memoirs of the Museum of Victoria* (until 1983 *Memoirs of the National Museum of Victoria*) and *Occasional Papers from the Museum of Victoria.*

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Two copies of the manuscript with accompanying plates and figures should be submitted to the Scientific Editor, Museum of Victoria, Swanston Street, Melbourne, Victoria 3000. Authors should consult a recent volume of the *Occasional Papers* to aquaint themselves with format.

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References should be listed alphabetically at the end of the manuscript. Journal citations must be in full. References to books must give the year of publication, edition, name of publisher and city of publication. Titles of books and names of journals should be underlined.

Photographs must have clear definition and may be submitted as either glossy or flat prints at the actual size for reproduction. Line drawings for text figures should be in black ink on white card or drawing film. Maximum full page size is 177 mm wide by 220 mm, single column width is 86 mm. Clear lettering must be inserted. Original drawings up to twice final size are acceptable.

Occasional Papers from the Museum of Victoria 5: 1–53 (1992)

The distribution of Victorian jewel beetles (Coleoptera: Buprestidae) – an ENTRECS project

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Abstract. Burns, G.G. and Burns, A.J., 1992. The distribution of Victorian jewel beetles (Coleoptera: Buprestidae) – an ENTRECS project. *Occasional Papers from the Museum of Victoria* 5: 1–53.

A checklist of the 300 species of Victorian Buprestidae is presented with maps showing the distribution of each species.

Introduction

The ENTRECS PROJECT of the Entomological Society of Victoria (Inc.) aims to record data on the distribution of insects in Victoria in a form which could be readily expanded to cover the whole of Australia. An explanatory handbook has been produced and data solicited from collectors. At its inception donations were received from two companies to assist in furthering the project. A first book with distribution maps of butterflies of Victoria was produced (Entomological Society of Victoria, 1986).

This, the second contribution to the project, is a checklist of the Victorian Buprestidae with maps showing the distribution of each species within Victoria. The text and maps have been compiled for the Entomological Society of Victoria (Inc.) on a Macintosh computer and are presented as a starting point for future workers. The compilation relies on the identifications of many collectors.

Systematics

Buprestidae, or jewel beetles, are, as their common name suggests, probably the most colourful of all beetles. Although they show great variation of size and colour they are all of much the same shape. The prothorax is closely joined to the rest of the body and the head fits neatly so that the beetle is compact, narrow and oval. They can be recognized by a transverse metasternal suture and the partly fused first two abdominal sternites (Matthews, 1985). The adults are very active in hot weather and fly readily in sunlight. Many can be found on nectar bearing flowers such as, *Eucalyptus, Leptospermum, Bursaria* and *Baeckia.*

The family name Buprestidae was introduced by Leach (1815) and used later by Eschscholtz (1829). The name is from Greek: "*bous*" (cattle) and "*prethein*" (to blow up). The beetles were evidently thought to be poisonous to animals and were probably confused with meloids (Bright, 1987). There are about 12 000 species worldwide with approximately 850 species known from Australia. Bellamy (1986) recognised seven subfamilies and 22 tribes for Australian Buprestidae. All subfamilies and 17 of the tribes are represented from Victoria by 300 species.

Bellamy's (1986) classification of the higher taxa and his synonymies are followed in this contribution. More recent changes to his systematic arrangement have not been followed. Cobos (1986) included *Merimna* Thomson in Melanophilini rather than in Actenodini as is usual. Toyama (1987) synonymised Chalcophorinae with Buprestinae but did not elaborate on how the tribes of Chalcophorinae should be considered. For some species dealt with in this paper more complete synonymies than are given here can be found in Carter and Théry (1929).

The only taxonomic changes made here involve *Pachycisseis* and *Neospades* (Bellamy, 1988: 417) and *Themognatha* and *Castiarina* (Gardner, 1990: 338). All four names have been elevated from subgeneric to generic rank.

Distribution maps

The ENTRECS scheme divides the State into major blocks, each corresponding to a map in the Commonwealth of Australia 1:250,000 series R502. Each block is given an alphabetical code. These major blocks are further subdivided into 54 areas each 10 minutes of latitude (18 km) by 10 minutes of longitude (15 km).

Map A shows the overall distribution of all buprestids recorded to 31 March 1990. The remaining maps are distributional maps for individual species. They represent data from 5735 records obtained from specimens in museums, private collections, literature, from private communication, or visually identified in the field. Each "record" represents one or more beetles in a single collection made at one time and place, or a unique field observation. Specimens come from 27 collections made by over 210 collectors. They date from the earlist specimens that we have been able to locate, 6 specimens of *Melobasis nervosa* Boisduval collected at Prahran in October 1865, until 31 March 1990.

The material for this report is based on collections in: Australian Museum, Sydney; Australian National Insect Collection, CSIRO, Canberra; Museum of Victoria, Melbourne; Queensland Museum, Brisbane; Entomology Department, University of Queensland, Brisbane; South Australian Museum,

[1] Gordon G. Burns died on 12 December 1990 shortly after completing this manuscript.

Adelaide; Tasmanian Museum, Hobart; Victorian Agricultural Insect Collection, Burnley; and the following private collections: E.E. Adams, G.W. Anderson, I. Faithfull, F. Hallgarten, J. Harslett, K. Hateley, D.R. Holmes, Y. Komiya, J.C. LeSouef, M.W. Mules, S.K. Smith. A. Sundholme, R.G. Thompson, G. and T. Williams and the authors' collection.

Maps are not provided for species recorded from Victoria only in the literature, or for species represented by specimens labelled simply as Victoria, Mallee dist., Western dist. or Gippsland. These are: *Neobubastes aureocincta* Blackburn, (Mallee dist.); *Neobubastes orientalis* Carter, (Vic.); *Balthasarella melandryoides* Obenberger, (literature); *Melobasis nais* Obenberger, (literature); *Melobasis occidentalis* Carter, (Western dist.); *Melobasis prominens* Obenberger, (literature); *Melobasis semimarginata* Obenberger, (literature); *Melobasis victoriae* Obenberger, (literature); *Themognatha aestimata* (Kerremans), (Vic.); *Themognatha conspicillata* (White), (Mallee dist.); *Themognatha pascoei* (Saunders), (Mallee dist.); *Themognatha sanguinea* (Saunders), (Mallee); *Castiarina arida* (Barker), (Vic.); *Castiarina commixta* (Carter), (Gippsland); *Neospades simplex* Blackburn, (Mallee dist.) and *Agrilus frenchi* Blackburn, (Vic.).

Some taxa described as "varieties" have not been investigated critically; *Torresita cuprifera* var. *limbata* Carter, *Melobasis gratiosissima* var. *aurora* Obenberger, *Melobasis gratiosissima* var. *amorosa* Obenberger, *Melobasis gratiosissima* var. *amabilior* Obenberger, *Melobasis obscurella* var. *chalcosoma* Obenberger, *Melobasis picticollis* var. *signatipennis* Obenberger, *Melobasis purpurascens* var. *anchoralis* Obenberger, *Melobasis vittata* var. *incipiens* Obenberger and *Stigmodera yarrelli* var. *coerulescens* Carter. As their precise status is unknown they are listed under the name of the species in which they were first described.

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CHECKLIST OF THE VICTORIAN BUPRESTIDAE

Family **BUPRESTIDAE** Eschscholtz
Buprestides Eschscholtz, 1829: 239.

Subfamily **POLYCESTINAE** Lacordaire
Polycestides Lacordaire, 1857: 61.

Tribe ASTRAEUSINI Cobos
Astraeusini Cobos, 1980: 28.
Buprestes (part) Carter and Théry, 1929: 270.

ASTRAEUS Laporte and Gory
Astraeus Laporte and Gory, 1837: 1.
Asthraeus Imhoff, 1856: 46 (misspelling).
Conognatha auctorum.

Subgenus ASTRAEUS Laporte and Gory

Astraeus (Astraeus) badeni van de Poll (Map 1)
Astraeus badeni van de Poll, 1889: 93.
Astraeus badeni var. *disjunctus* Obenberger, 1928: 204 (Barker, 1989: 188).

Astraeus (Astraeus) dilutipes van de Poll (Map 2)
Astraeus samouelli var. *dilutipes* van de Poll, 1886b: 180.
Astraeus strandi Obenberger, 1928: 205 (Barker, 1975: 123).

Astraeus (Astraeus) jansoni van de Poll (Map 3)
Astraeus jansoni van de Poll, 1889: 94.
Astraeus tepperi Blackburn, 1890a: 1258 (Barker, 1975: 133).

Astraeus (Astraeus) major Blackburn (Map 4)
Astraeus major Blackburn, 1890a: 1257.
Astraeus navarchis var. *major*.—Carter, 1929: 282 (Barker, 1975: 127).

Astraeus (Astraeus) mastersii Macleay (Map 5)
Astraeus mastersii Macleay, 1872: 239.
Astraeus samouelli van de Poll, 1886b: 176 (Barker, 1975: 122).
Astraeus splendens van de Poll, 1889: 108 (Barker, 1975: 122).
Astraeus simplex Blackburn, 1892d: 211 (Barker, 1975: 122).
Astraeus mastersi auctorum.

Astraeus (Astraeus) navarchis (Thomson) (Map 6)
Conognatha navarchis Thomson, 1856: 115, pl. 6, fig. 2.
Astraeus (Astraeus) navarchis (Thomson) (Barker, 1975: 114, 127).

Astraeus (Astraeus) pygmaeus van de Poll (Map 7)
Astraeus pygmaeus van de Poll, 1886b: 178.
Astraeus pygmaeus var. *subfasciatus* van de Poll, 1886b: 178 (Barker, 1975: 118).
Astraeus samouellei var. *pygmaeus*. — Blackburn, 1890a: 1256.
Astraeus samouelli var. *pygmaeus*. — Kerremans, 1892: 102 (misspelling).
Astraeus pygmaens. — Kerremans, 1903a: 148 (misspelling).
Astraeus pygmaens var. *subfasiatus*. — Kerremans, 1903a:148 (misspelling).
Astraeus pygmacus. — Carter, 1929: 282 (misspelling).
Astraeus pygmacus var. *subfasciatus*. — Carter, 1929: 282 (misspelling).

Subgenus DEPOLLUS Barker
Depollus Barker, 1975:105.

Astraeus (Depollus) irregularis van de Poll (Map 8)
Astraeus irregularis van de Poll, 1889: 86.

Tribe PROSPHERINI Cobos
Prospherini Cobos, 1980: 84.
Polycestae (part) Carter and Théry, 1929: 269.

PROSPHERES Saunders
Prospheres Saunders, 1868b: 11.
Phospheres Thomson, 1878: 61 (misspelling).

Prospheres aurantiopicta (Gory and Laporte) (Map 9)
Buprestis aurantiopicta Gory and Laporte, 1837: 132.
Prospheres aurantiopicta (Gory and Laporte) (Saunders, 1868b: 7).
Stigmodera gulielmi White, 1859b: 120 (Levey, 1978a: 713, 721).
Buprestis moesta Carter, 1915: 77 (Levey, 1978a: 713, 721).
Prospheres aurantiopictus var. *caledonicus* Obenberger, 1924a: 32 (Levey, 1978a: 713, 721).

Subfamily **MASTOGENINAE** Leconte and Horn
Mastogeninae Leconte and Horn, 1883: 199 (as tribe).

Tribe MASTOGENINI

HELFERELLA Cobos
Helferella Cobos 1957: 91.

Helferella frenchi (Théry) (Map 10)
Mastogenius frenchi Théry, 1928: 456.
Helferella frenchi (Théry) (Williams and Weir, 1987: 159).

Subfamily **CHALCOPHORINAE** Lacordaire
Chalcophorides Lacordaire, 1857: 14 .

Tribe EPISTOMENTINI Levey
Epistomentini Levey, 1978b: 155.

CYRIA Solier
Cyria Solier, 1833: 269.
Euchloris Billberg teste Mannerheim, 1837: 30.
Cyrioides Carter, 1920: 222.
Xenocyria Obenberger, 1947: 129.

Cyria imperialis (Fabricius) (Map 11)
Buprestis imperialis Fabricius, 1801: 204.
Cyria imperialis (Fabricius) (Saunders, 1868b: 3).

DIADOXUS Thomson
Diadoxus Thomson, 1878:15.
Stigmodera auctorum.
Anthaxia auctorum.

Diadoxus erythrurus (White) (Map 12)
Stigmodera erythrura White, 1843b: 507, pl.1, fig. 7.
Diadoxus erythrurus (White) (Saunders, 1868b: 4).
Diadoxus jungi Blackburn (Map 13)
Diadoxus jungi Blackburn, 1899: 28.
Diadoxus scalaris (Gory and Laporte) (Map 14)
Buprestis scalaris Gory and Laporte, 1837: 141.
Diadoxus scalaris (Gory and Laporte) (Saunders, 1868b: 4).
Diadoxus scalaris var. *blackburni* Obenberger, 1923b: 72.

Tribe CHALCOPHORINI

IRIDOTAENIA Deyrolle
Iridotaenia Deyrolle, 1864: 25.
Paracupta auctorum.

Iridotaenia albivittis (Hope) (Map 15)
Buprestis albivittis Hope, 1846: 214.
Iridotaenia albivittis (Hope) (Carter, 1929: 301).
Chrysodema pyritosa Boheman, 1858: 58.

CHALCOTAENIA Deyrolle
Chalcotaenia Deyrolle, 1864: 12.
Chalcophora auctorum.

Chalcotaenia exilis (Blackburn) (Map 16)
Chalcophora exilis Blackburn, 1894: 98.

Tribe JULODIMORPHINI Kerremans
Julodimorphites Kerremans, 1902: 16.
Julodimorphae Carter and Théry, 1929: 271.

JULODIMORPHA Thomson

Julodimorpha Thomson, 1878: 51.

Julodimorpha bakewellii (White) (Map 17)
Stigmodera bakewellii White, 1859a: 290.
Julodimorpha bakewellii (White) (Thomson, 1878: 51).
Julodimorpha saundersii Thomson, 1878: 51 (Obenberger, 1926: 35).
Julodimorpha bakewelli auctorum.

Subfamily **BUPRESTINAE** Lacordaire
Buprestides Lacordaire, 1857: 33.

Tribe BUBASTINI Obenberger
Bubastini Obenberger, 1920a: 89.
Buprestes (part) Carter and Théry, 1929: 270.

NEOBUBASTES Blackburn
Neobubastes Blackburn, 1892d: 213.
Castelnaudina Obenberger, 1924b: 17.
Castelnaudia Obenberger, 1923a: 14 (preocc.).

Neobubastes aureocincta Blackburn
Neobubastes aureocincta Blackburn, 1892d: 213.
Neobubastes aureocincta var. *scutalis* Blackburn, 1892d: 213 (Obenberger, 1930: 303).
Castelnaudia australasiae Obenberger, 1923a: 15.

NOTOBUBASTES Carter
Notobubastes Carter, 1924a: 24.

Notobubastes orientalis Carter
Notobubastes orientalis Carter, 1924a: 25.

BUBASTES Laporte and Gory

Bubastes Laporte and Gory, 1836: 1.
Neraldus Théry, 1911: 17.

Bubastes globicollis Thomson (Map 18)
Bubastes globicollis Thomson, 1879a: 14.
Bubastes simillimus Obenberger, 1922b: 81.

Tribe DICERCINI Kerremans
Dicercites Kerremans, 1903a: 124.
Buprestes (part) Carter and Théry, 1929: 270.

MICROCASTALIA Heller
Microcastalia Heller, 1891: 135.
Bubastodes Blackburn, 1892d: 212.

Microcastalia globithorax (Thomson) (Map 19)
Castalia globithorax Thomson, 1878: 46.
Microcastalia globithorax (Thomson) (Kerremans, 1906: 421).
Bubastodes sulcicollis Blackburn, 1892d: 212.

Tribe BUPRESTINI
Buprestes (part) Carter and Théry, 1929: 270.

NEOBUPRESTIS Kerremans
Neobuprestis Kerremans, 1903a: 136.
Sphenoptera auctorum.
Strigoptera auctorum.

Neobuprestis frenchi (Blackburn) (Map 20)
Strigoptera frenchi Blackburn, 1892a: 500.
Neobuprestis frenchi (Blackburn) (Carter, 1924b: 524).
Neobuprestis marmorata (Blackburn) (Map 21)
Strigoptera marmorata Blackburn, 1892a: 501.
Neobuprestis marmorata (Blackburn) (Carter, 1924b: 524).
Neobuprestis peroni (Gory and Laporte) (Map 22)
Stigmodera peroni Gory and Laporte, 1837: 48.
Neobuprestis peroni (Gory and Laporte) (Obenberger, 1930: 363).
Strigoptera australis Blackburn, 1892a: 501 (Obenberger, 1930: 363).

NASCIO Laporte and Gory
Nascio Laporte and Gory, 1837: 1.
Geronia Dejean, 1837: 89.

Nascio vetusta (Boisduval) (Map 23)
Buprestis vetusta Boisduval, 1835: 85.
Nascio vetusta (Boisduval) (Gory and Laporte, 1837: 2).
Nascio lunaris Kerremans, 1900: 294 (Obenberger, 1930: 367).
Nascio vetusta var. *brunneipuncta* Obenberger, 1928: 204 (Obenberger, 1930: 368).

NASCIOIDES Kerremans
Nascioides Kerremans, 1903a: 147.

Nascioides parryi (Hope) (Map 24)
Stigmodera parryi Hope, 1845: 103.
Nascioides parryi (Hope) (Kerremans, 1903a: 147).
Stigmodera saundersii Hope, 1846: 213 (Williams, 1987: 137).
Nascioides quadrinotatus (van de Poll) (Map 25)
Nascio quadrinotata van de Poll, 1886a: 123.
Nascioides quadrinotatus (van de Poll) (Williams, 1987: 139).

BALTHASARELLA Obenberger
Balthasarella Obenberger, 1958: 487.

Balthasarella melandryoides Obenberger
Balthasarella melandryoides Obenberger, 1958 ; 489.

Tribe MELANOPHILINI Bedel
Melanophilini Bedel, 1921: 171.
Anthaxiae (part) Carter and Théry, 1929: 270 .

TORRESITA Gemminger and Harold
Torresita Gemminger and Harold, 1869: 1382 (not described).
Plagiope Saunders. 1868b: 12 (not described, preocc.).

Torresita cuprifera (Kirby) (Map 26)
Buprestis cuprifera Kirby, 1818b: 457.
Torresita cuprifera (Kirby) (Gemminger and Harold, 1869: 1382).
Buprestis chrysochloris Gory and Laporte, 1837: 122.
Melobasis dilatata Redtenbacher, 1867: 85.
Torresita aenea Thomson, 1879a: 23.
Torresita cuprifera var. *limbata* Carter, 1934: 258.

PSEUDANILARA Théry
Pseudanilara Théry, 1911: 32.
Neotorresita Obenberger, 1923a: 19.
Pseudanilara bicolor Carter (Map 27)
Pseudanilara bicolor Carter, 1924b: 524.
Pseudanilara cupripes (Macleay) (Map 28)
Anthaxia cupripes Macleay, 1872: 242.
Pseudanilara cupripes (Macleay) (Carter, 1924b: 526).
Neocuris dilaticollis Blackburn, 1892c: 42.
Melobasis laticeps Kerremans, 1898: 126.
Melanophila australasiae Kerremans, 1903b: 59.
Neotorresita achardi Obenberger, 1923a: 20.
Neotorresita achardi ssp. *occidentis* Obenberger, 1924a: 69.
Pseudanilara pilosa (Carter) (Map 29)
Neocuris pilosa Carter, 1913: 510.
Pseudanilara pilosa (Carter) (Carter, 1928: 279)
Pseudanilara purpureicollis (Macleay) (Map 30)
Anthaxia purpureicollis Macleay, 1872: 242.
Pseudanilara purpureicollis (Macleay) (Carter, 1924b: 525).
Anthaxia nigra Macleay, 1872: 243.
Neocuris nigricans Blackburn, 1892c: 43.
Pseudanilara roberti Théry, 1911: 32.

MELOBASIS Gory and Laporte
Melobasis Gory and Laporte, 1837: 118.
Abrobapta Dejean, 1837: 90.

Subgenus MELOBASIS Gory and Laporte

Melobasis (s. str.) abnormis Carter (Map 31)
Melobasis abnormis Carter, 1923b: 94.
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Stigmodera (Castiarina) brutella spp. victrix Obenberger, 1922b: 119 (Barker, 1986: 28).

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Stigmodera (Castiarina) castelnaudi var. *naias* Obenberger, 1933: 104 (Barker, 1986: 29).

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Stigmodera (Castiarina) amphichroa var. *allecto* Obenberger, 1933: 105 (Barker, 1986: 29).
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Stigmodera dimidiata Carter, 1908: 422.
Stigmodera (Castiarina) dorsalis Obenberger, 1922b: 118 (Barker, 1986: 30).
Stigmodera (Castiarina) leai var. fasciosa Obenberger, 1922b: 122 (Barker, 1986: 30).

Castiarina distinguenda (Saunders) (Map 137)
Stigmodera distinguenda Saunders, 1869: 9.
Stigmodera distinguenda ssp. *differens* Carter, 1931b: 364 (Barker, 1986: 30).

Castiarina dugganensis (Barker) (Map 138)
Stigmodera (Castiarina) dugganensis Barker, 1987: 136.

Castiarina erasma (Carter) (Map 139)
Stigmodera erasma Carter, 1935: 180.

Castiarina erythromelas (Boisduval) (Map 140)
Buprestis erythromelas Boisduval, 1835: 75.
Stigmodera longula Blackburn, 1892c: 54 (Barker, 1986: 30).
Stigmodera (Castiarina) cicerini Obenberger, 1928: 331 (Barker, 1986: 30).

Castiarina erythroptera (Boisduval) (Map 141)
Buprestis erythroptera Boisduval, 1835: 88.
Stigmodera canaliculata Blackburn, 1892c: 51 (Barker, 1986: 30).
Stigmodera (Castiarina) erythroptera ssp. nigroterminata Carter, 1934: 257 (Barker, 1986: 30).

Castiarina flava (Saunders) (Map 142)
Stigmodera flava Saunders, 1869: 17.
Stigmodera flavescens Masters, 1886: 86 (Barker, 1986: 30).
Stigmodera flava.- Thomson, 1878: 55.
Stigmodera flavidula Kerremans, 1890a: 47 (Barker, 1986: 30).
Stigmodera (Castiarina) flava var. *notulata* Obenberger, 1922b: 115 (Barker, 1986: 30).

Castiarina flavopicta (Boisduval) (Map 143)
Buprestis flavopicta Boisduval, 1835: 92.
Stigmodera flavopicta.- Gory and Laporte, 1837: 44.
Stigmodera flavovaria Saunders, 1871: 74 (Barker, 1986: 30).
Stigmodera (Castiarina) flavopicta var. *nausicaa* Obenberger, 1933: 110 (Barker, 1986: 30).
Stigmodera (Castiarina) avopicta var. *erato* Obenberger, 1933: 110 (Barker, 1986: 30).
Stigmodera (Castiarina) flavopicta var. *palaeno* Obenberger, 1933: 111 (Barker, 1986: 30).
Stigmodera (Castiarina) flavopicta var. iris Obenberger, 1933: 111 (Barker, 1986: 30).
Stigmodera (Castiarina) flavopicta var. phaedusa Obenberger, 1933: 111 (Barker, 1986: 30).
Stigmodera (Castiarina) flavopicta var. antiope Obenberger, 1933: 112 (Barker, 1986: 30).
Stigmodera (Castiarina) flavopicta var. callidice Obenberger, 1933: 112 (Barker, 1986: 30).

Castiarina flavopurpurea (Carter) (Map 144)
Stigmodera flavopurpurea Carter, 1908: 421.

Castiarina flavosignata (Macleay) (Map 145)
Stigmodera flavosignata Macleay, 1863: 30.
Stigmodera (Castiarina) circumflexa Obenberger, 1922b: 121 (Barker, 1986: 30).
Stigmodera (Castiarina) flavosignata var. *rufosignata* Carter, 1931b: 349 (Barker, 1986: 30).

Castiarina fossoria (Carter) (Map 146)
Stigmodera (Castiarina) fossoria Carter, 1927: 226.

Castiarina fulviventris (Macleay) (Map 147)
Stigmodera fulviventris Macleay, 1863: 22.
Stigmodera guttigera Blackburn, 1901, p. 24 (Barker, 1986: 30).
Stigmodera (Castiarina) mackayana Carter, 1930b: 536 (Barker, 1986: 30).

Castiarina gardnerae (Barker) (Map 148)
Stigmodera (Castiarina) gardnerae Barker, 1987: 144.

Castiarina gibbicollis (Saunders) (Map 149)
Stigmodera gibbicollis Saunders, 1868a: 470.
Stigmodera fascigera Kerremans, 1890a: 42 (Barker, 1986: 30).

Castiarina gordonburnsi (Barker) (Map 150)
Stigmodera (Castiarina) gordonburnsi Barker, 1987: 138.

Castiarina goudiana (Barker) (Map 151)
Stigmodera (Castiarina) goudiana Barker, 1987: 139.

Castiarina hateleyi (Barker) (Map 152)
Stigmodera (Castiarina) hateleyi Barker, 1980: 4.

Castiarina helmsi (Carter) (Map 153)
Stigmodera helmsi Carter, 1906: 259.

Castiarina hilaris (Hope) (Map 154)
Stigmodera hilaris Hope, 1846: 213.
Stigmodera (Castiarina) hilaris var. *infasciata Carter*, 1933: 163 (Barker, 1986: 31).

Castiarina hoffmanseggii (Hope) (Map 155)
Stigmodera hoffmanseggii Hope, 1846: 211.
Stigmodera fairmairei Kerremans, 1898: 140 (Barker, 1986: 31).

Castiarina hoffmanseggi auctorum.

Castiarina ignea (Blackburn) (Map 156)
Stigmodera ignea Blackburn, 1892d: 219.
Stigmodera unica Kerremans, 1898: 150 (Barker, 1986: 31).

Castiarina ignota (Saunders) (Map 157)
Stigmodera ignota Saunders, 1869: 12.

Castiarina imitator (Carter) (Map 158)
Stigmodera (Castiarina) imitator Carter, 1930a: 180.

Castiarina inconspicua (Saunders) (Map 159)
Stigmodera inconspicua Saunders, 1868a: 476.
Stigmodera electa Kerremans, 1898: 154 (Barker, 1986: 31).

Castiarina indistincta (Saunders) (Map 160)
Stigmodera indistincta Saunders, 1869: 11.
Stigmodera (Castiarina) indistincta var. *anchorifera* Obenberger, 1933: 76 (Barker, 1986: 31).
Stigmodera (Castiarina) indistincta var. *electa* Obenberger, 1933: 76 (Barker, 1986: 31).
Stigmodera (Castiarina) indistincta var. *acclivis* Obenberger, 1933: 76 (Barker, 1986: 31).
Stigmodera (Castiarina) indistincta var. *extrema* Obenberger, 1933: 76 (Barker, 1986: 31).

Castiarina insignis (Blackburn) (Map 161)
Stigmodera insignis Blackburn, 1892d: 217.
Stigmodera caudata Kerremans, 1900: 316 (preocc.)

Castiarina insularis (Blackburn) (Map 162)
Stigmodera insularis Blackburn, 1897: 30.
Stigmodera cognata Kerremans, 1898: 136 (Barker, 1986: 31).

Castiarina interstitialis (Carter) (Map 163)
Stigmodera (Castiarina) interstitialis Carter, 1931b: 345.

Castiarina jeanae (Barker) (Map 164)
Stigmodera (Castiarina) jeanae Barker, 1983: 164.

Castiarina jekellii (Saunders) (Map 165)
Stigmodera jekellii Saunders, 1868a: 467.
Castiarina jekelli auctorum.

Castiarina jospilota (Gory and Laporte) (Map 166)
Stigmodera jospilota Gory and Laporte, 1837: 35.
Stigmodera (Castiarina) lacerta Obenberger, 1933: 109 (Barker, 1986: 31).

Castiarina kerremansi (Blackburn) (Map 167)
Stigmodera kerremansi Blackburn, 1890b: 147.
Stigmodera apicalis Kerremans, 1890a: 45 (Barker, 1986: 31).

Castiarina kershawi (Carter) (Map 168)
Stigmodera (Castiarina) kershawi Carter, 1924b: 522.
Stigmodera (Castiarina) kershawi var. *carterella* Obenberger, 1933: 104 (Barker, 1986: 31).

Castiarina kiatae (Barker) (Map 169)
Stigmodera (Castiarina) kiatae Barker, 1980: 6.

Castiarina kirbyi (Guerin) (Map 170)
Buprestis kirbyi Guerin, 1830: 65.
Stigmodera tacita Kerremans, 1898: 153 (Barker, 1986: 31).
Stigmodera (Castiarina) kirbyi var. *adonis* Obenberger, 1922b: 118 (Barker, 1986: 31).
Stigmodera (Castiarina) kirbyi var. *peregrina* Obenberger, 1922b: 118 (Barker, 1986: 31).

Castiarina klugii (Gory and Laporte) (Map 171)
Stigmodera klugii Gory and Laporte, 1837: 27.
Stigmodera (Castiarina) klugi var. *nixa* Obenberger, 1933: 75 (Barker, 1986: 31).
Castiarina klugi auctorum.

Castiarina leai (Carter) (Map 172)
Stigmodera leai Carter, 1916: 136.

Castiarina livida (Barker) (Map 173)
Stigmodera (Castiarina) livida Barker, 1987: 140.

Castiarina malleeana (Carter) (Map 174)
Castiarina malleeana Carter, 1931b: 340.

Castiarina marginata (Barker) (Map 175)
Stigmodera (Castiarina) marginata Barker, 1983: 151.

Castiarina marginicollis (Saunders) (Map 176)
Stigmodera marginicollis Saunders, 1868a: 469.
Stigmodera (Castiarina) bifasciatella Obenberger, 1922b: 115 (Barker, 1986: 32).

Castiarina media (Hope) (Map 177)
Stigmodera media Hope, 1847: 284.
Stigmodera septemmaculata Blackburn, 1892c: 45 (Barker, 1986: 32).
Stigmodera (Castiarina) septemnotata Carter, 1916: 86 (Barker, 1986: 32).

Castiarina militaris (Carter) (Map 178)
Stigmodera militaris Carter, 1922: 71.

Castiarina montigena (Oke) (Map 179)
Stigmodera montigena Oke, 1928: 25.
Stigmodera (Castiarina) alpestris Barker, 1983: 146 (Barker, 1986: 32).

Castiarina nasuta (Saunders) (Map 180)
Stigmodera nasuta Saunders, 1869: 15.
Stigmodera (Castiarina) fossithorax Obenberger, 1928: 329 (Barker, 1986: 32).

Castiarina oblita (Carter) (Map 181)
Stigmodera (Castiarina) oblita Carter, 1931b: 347.

Castiarina obscura (Saunders) (Map 182)
Stigmodera obscura Saunders, 1869: 26.
Stigmodera (Castiarina) obscura var. *posticedivisa* Obenberger, 1933: 106 (Barker, 1986: 32).
Stigmodera (Castiarina) obscura var. *anticedivisa* Obenberger, 1933: 106 (Barker, 1986: 32).

Castiarina ochreiventris (Saunders) (Map 183)
Stigmodera ochreiventris Saunders, 1869: 8.
Stigmodera cara Blackburn, 1892d: 216 (Barker, 1986: 32).

Castiarina octomaculata (Saunders) (Map 184)
Stigmodera octomaculata Saunders, 1868a: 472.

Castiarina octospilota (Gory and Laporte) (Map 185)
Stigmodera octospilota Gory and Laporte, 1837: 28.
Stigmodera femorata Gory and Laporte, 1837: 37 (Barker, 1986: 32).
Stigmodera octospilota var. *roseipes* Deuquet, 1956: 154 (Barker, 1986: 32).

Castiarina ornata (Blackburn) (Map 186)
Stigmodera ornata Blackburn, 1892c: 53.

Castiarina ovata (Barker) (Map 187)
Stigmodera (Castiarina) ovata Barker, 1979: 10.

Castiarina pallidipennis (Blackburn) (Map 188)
Stigmodera pallidipennis Blackburn, 1890b: 154.

Castiarina pallidiventris (Gory and Laporte) (Map 189)
Stigmodera pallidiventris Gory and Laporte, 1837: 42.
Stigmodera rustica Kerremans, 1898: 154 (Barker, 1986: 32).

Castiarina parallela (White) (Map 190)
Stigmodera parallela White, 1859b: 119.
Stigmodera elongatula Macleay, 1872: 246 (Barker, 1986: 32).

Castiarina parallelipennis (Obenberger) (Map 191)
Stigmodera parallelipennis Obenberger, 1934: 725 (replacement name).
Stigmodera parallela Saunders, 1869: 16 (preocc.).

Castiarina perlonga (Carter) (Map 192)
Stigmodera (Castiarina) perlonga Carter, 1931b: 343.

Castiarina piliventris (Saunders) (Map 193)
Stigmodera piliventris Saunders, 1868a: 474.
Stigmodera generosa Kerremans, 1898: 150 (Barker, 1986: 33).

Castiarina placida (Thomson) (Map 194)
Stigmodera placida Thomson, 1879a: 33.

Castiarina praetermissa (Carter) (Map 195)
Stigmodera praetermissa Carter, 1921: 306.

Castiarina producta (Saunders) (Map 196)
Stigmodera producta Saunders, 1868a: 482.
Stigmodera acutipennis Thomson, 1879a: 38 (Barker, 1986: 33).
Stigmodera (Castiarina) sulcicollis Kerremans, 1903a: 209 (Barker, 1986: 33).
Stigmodera (Castiarina) producta var. *polymele* Obenberger, 1933: 112 (Barker, 1986: 33).

Castiarina pulchripes (Blackburn) (Map 197)
Stigmodera pulchripes Blackburn, 1897: 31.
Castiarina punctatosulcata (Saunders) (Map 198)
Stigmodera punctatosulcata Saunders, 1869: 24.
Stigmodera litigiosa Kerremans, 1890a: 45 (Barker, 1986: 33).
Castiarina punctiventris (Saunders) (Map 199)
Stigmodera punctiventris Saunders, 1869: 17.
Stigmodera (Castiarina) pisciformis Carter, 1916: 125 (Barker, 1986: 33).
Castiarina recta (Saunders) (Map 200)
Stigmodera recta Saunders, 1869: 23.
Castiarina rectifasciata (Saunders) (Map 201)
Stigmodera rectifasciata Saunders, 1868a: 472.
Stigmodera vigilans Kerremans, 1898: 143 (Barker, 1986: 33).
Castiarina robusta (Saunders) (Map 202)
Stigmodera robusta Saunders, 1869: 6.
Stigmodera (Castiarina) robusta var. *castula* Obenberger, 1933: 75 (Barker, 1986: 33)
Stigmodera (Castiarina) robusta var. *unifasciatella* Obenberger, 1933: 75 (Barker, 1986: 33).
Stigmodera (Castiarina) robusta var. *tristigmata* Obenberger, 1933: 75 (Barker, 1986: 33).
Castiarina rufa (Barker) (Map 203)
Stigmodera (Castiarina) rufa Barker, 1986: 9.
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Buprestis rufipennis Kirby, 1818b: 456.
Stigmodera crocipennis Gory and Laporte, 1837: 21 (Barker, 1986: 33).
Stigmodera crocipennis Hope, 1846: 292 (Barker, 1986: 33) (this reference not checked)
Stigmodera (Castiarina) rufipennis var. *quadrifoveolata* Obenberger, 1933: 69 (Barker, 1986: 33).
Castiarina scalaris (Boisduval) (Map 205)
Buprestis scalaris Boisduval, 1835: 89.
Buprestis cyanicollis Boisduval, 1835: 91 (Barker, 1986: 33).
Stigmodera crucigera Gory and Laporte, 1837: 40 (Barker, 1986: 33).
Stigmodera viridis Gory and Laporte, 1837: 46 (Barker, 1986: 33).
Calochroa crucigera Hope, 1838: 162 (Barker, 1986: 33).
Stigmodera transversepicta Thomson, 1879a: 35 (Barker, 1986: 33).
Stigmodera macleayi Blackburn, 1892c: 48 (Barker, 1986: 33).
Stigmodera prudens Kerremans, 1898: 152 (Barker, 1986: 33).
Stigmodera (Castiarina) suavis Kerremans, 1903a: 210 (Barker, 1986: 33).
Stigmodera (Castiarina) crucioides Obenberger, 1922b: 118 (Barker, 1986: 33).
Stigmodera (Castiarina) scalaris var. *acte* Obenberger, 1933: 108 (Barker, 1986: 33).
Stigmodera (Castiarina) scalaris var. *archianassa* Obenberger,1933: 108 (Barker, 1986: 33).
Castiarina scintillata (Barker) (Map 206)
Stigmodera (Castiarina) scintillata Barker, 1983: 164.
Castiarina semicincta (Gory and Laporte) (Map 207)
Stigmodera semicincta Gory and Laporte, 1837: 19.
Castiarina semisuturalis (Saunders) (Map 208)
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Stigmodera speciosa Kerremans, 1898: 137 (Barker, 1986: 33).
Castiarina septemguttata (Waterhouse) (Map 209)
Stigmodera septemguttata Waterhouse, 1874: 540.
Castiarina sexguttata (Macleay) (Map 210)
Sigmodera sexguttata Macleay, 1863: 29.
Stigmodera (Castiarina) carteri Obenberger, 1922b: 123 (Barker, 1986: 34).
Stigmodera (Castiarina) sexguttata var. *humerigutta* Obenberger, 1922b: 123 (Barker, 1986: 34).
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Stigmodera sexplagiata Gory, 1841: 132 (replacement name).
Stigmodera crenata Gory and Laporte, 1837: 39 (preocc.)
Stigmodera plagiata Gory, 1841, err. add (Barker, 1986: 34).
Castiarina hopei Boheman, 1858: 61 (Barker, 1986: 34).
Castiarina similata Boheman, 1858: 62 (Barker, 1986: 34).
Stigmodera krefftii Macleay, 1872: 245 (Barker, 1986: 34).
Stigmodera (Castiarina) variata Kerremans, 1903a: 209 (Barker, 1986: 34).
Castiarina simulata (Gory and Laporte) (Map 212)
Stigmodera simulata Gory and Laporte, 1837: 26.
Stigmodera perplexa Hope, 1846: 211 (Barker, 1986: 34).
Buprestis helenae Hope, 1846: 215 (Barker, 1986: 34).
Buprestis lanuginosa Hope, 1846: 215 (Barker, 1986: 34).
Stigmodera lais Thomson, 1879a: 33 (Barker, 1986: 34).
Stigmodera phryne Thomson, 1879a: 33 (Barker, 1986: 34).
Stigmodera distinguenda Thomson, 1879a: 34 (Barker, 1986: 34).
Stigmodera fraterna Kerremans, 1890 a: 46 (Barker, 1986: 34).
Stigmodera equina Blackburn, 1892c: 48 (Barker, 1986: 34).
Stigmodera (Castiarina) ravilla Obenberger, 1922b: 117 (Barker, 1986: 34).
Stigmodera (Castiarina) acutangula Obenberger, 1928: 333 (Barker, 1986: 34).
Stigmodera (Castiarina) yorkensis Obenberger, 1928: 335 (Barker, 1986: 34).
Stigmodera (Castiarina) burchelli var. dominula Obenberger, 1933: 76 (Barker, 1986: 34).
Castiarina skusei (Blackburn) (Map 213)
Stigmodera skusei Blackburn. 1892c: 46.
Castiarina spinolae (Gory) (Map 214)
Stigmodera spinolae Gory, 1841: 129.
Castiarina straminea (Macleay) (Map 215)
Stigmodera straminea Macleay, 1863: 25.
Stigmodera addenda Kerremans, 1898: 149 (Barker, 1986: 34).
Stigmodera johannae Théry, 1911: 55 (Barker, 1986: 34).
Castiarina subpura (Blackburn) (Map 216)
Stigmodera subpura Blackburn, 1903: 307.
Castiarina subtincta (Carter) (Map 217)
Stigmodera (Castiarina) subtincta Carter, 1933: 159.
Castiarina subvicina (Barker) (Map 218)
Stigmodera (Castiarina) subvicina Barker, 1983: 163.
Castiarina supergrata (Barker) (Map 219)
Stigmodera (Castiarina) supergrata Barker, 1983: 153.
Castiarina terminalis (Kerremans) (Map 220)
Stigmodera terminalis Kerremans, 1890a: 45.
Castiarina testacea (Saunders) (Map 221)
Stigmodera testacea Saunders, 1869: 14.
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Stigmodera thomsoni Saunders, 1868a: 477.
Stigmodera cordifer Kerremans, 1890a: 44 (Barker, 1986: 34).
Stigmodera colorata Kerremans, 1898: 141 (Barker, 1986: 34).
Stigmodera dulcis Blackburn, 1900: 41 (Barker, 1986: 34).
Castiarina triramosa (Thomson) (Map 223)
Stigmodera triramosa Thomson, 1879a: 32.
Castiarina uncata (Barker) (Map 224)
Stigmodera (Castiarina) uncata Barker, 1986: 11.
Castiarina undulata (Donovan) (Map 225)
Buprestis undulata Donovan, 1805, pl. 7, fig. 5.
Castiarina laportei Boheman, 1858: 61 (Barker, 1986: 35).
Stigmodera (Castiarina) opacipennis Obenberger, 1922b: 116 (Barker, 1986: 35).
Castiarina variegata (Barker) (Map 226)
Stigmodera (Castiarina) variegata Barker, 1983: 162.
Castiarina variopicta (Thomson) (Map 227)
Stigmodera variopicta Thomson, 1878: 54.
Castiarina vegeta (Hope) (Map 228)
Stigmodera vegeta Hope, 1847: 283.

Stigmodera coeruleiventris Saunders, 1869: 20 (Barker, 1986: 35).
Stigmodera (Castiarina) vegeta var. *hopeana* Obenberger, 1933: 104 (Barker, 1986: 35).

Castiarina vicina (Saunders) (Map 229)
Stigmodera vicina Saunders, 1868b: 43 (replacement name).
Stigmodera bicincta Gory and Laporte, 1837: 31 (preocc.).

Castiarina victoriensis (Blackburn) (Map 230)
Stigmodera victoriensis Blackburn, 1890b: 152.
Stigmodera sensitiva Kerremans, 1898: 148 (Barker, 1986: 35).

Castiarina viridolinea (Barker) (Map 231)
Stigmodera (Castiarina) viridolinea Barker, 1986: 25.

Castiarina vittata (Saunders) (Map 232)
Stigmodera vittata Saunders, 1868a: 478.

Castiarina wellsae (Barker) (Map 233)
Stigmodera (Castiarina) wellsae Barker, 1989: 193.

Castiarina wilsoni (Saunders) (Map 234)
Stigmodera wilsoni Saunders, 1868a: 476.
Stigmodera sigma Kerremans, 1890a: 43 (Barker, 1986: 35).
Stigmodera confinis Kerremans, 1898: 151 (Barker, 1986: 35).
Stigmodera (Castiarina) wilsoni ssp. *septentrionis* Obenberger, 1922b: 16 (Barker, 1986: 35).

Castiarina xanthopilosa (Hope) (Map 235)
Stigmodera xanthopilosa Hope, 1847: 283.
Castiarina splendida Gehin, 1855: 64 (Barker, 1986: 35).
Stigmodera (Castiasrina) xanthospilosa var. subfascigera Obenberger, 1933: 70 (misspelling).
Stigmodera (Castiarina) xanthospilosa var. *dichroptera* Obenberger, 1933: 70 (misspelling).

Subfamily **CHRYSOBOTHRINAE** Gory and Laporte
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Tribe CHRYSOBOTHRINI
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CHRYSOBOTHRIS Eschscholtz
Chrysobothris Eschscholtz, 1829: 9.
Amblis Gistel, 1834: 10.
Odontomus Kirby, 1837: 156.
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Chrysobothris mastersii Macleay (Map 236)
Chrysobothris mastersii Macleay, 1872: 247.
Chrysobothris blackburni Obenberger, 1923b: 77 (Carter, 1940: 384).
Chrysobothris mastersi auctorum.

Tribe ACTENODINI Kerremans
Actenodini Kerremans, 1893: 112.
Actenodae Carter and Théry, 1929: 269.

MERIMNA Thomson
Merimna Thomson, 1878: 42.

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Chrysobothris atrata Gory and Laporte, 1837: 58.
Merimna atrata (Gory and Laporte) (Thomson, 1878: 43).
Merimna corporaali Obenberger, 1924a: 69.

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Agrili Carter and Théry, 1929: 268.

Tribe COROEBINI Bedel
Coroebini Bedel, 1921: 170.

SYNECHOCERA Deyrolle
Synechocera Deyrolle, 1864: 115.

Synechocera tasmanica Théry (Map 238)
Synechocera tasmanica Théry, 1923: 517.
Synechocera longior Carter, 1928: 274 (Bellamy, 1987: 24).

PARACEPHALA Thomson
Paracephala Thomson, 1878: 91.

Paracephala murina Thomson (Map 239)
Paracephala murina Thomson, 1878: 91.
Paracephala cylindrica Kerremans, 1898: 177 (Carter, 1940: 388).

Paracephala pistacina (Hope) (Map 240)
Agrilus pistacinus Hope, 1846: 218.
Paracephala pistacina (Hope) (Saunders, 1868b: 63).
Aphanisticus canaliculatus Germar, 1848: 180 (Carter, 1940: 388).
Paraceplala minuta Kerremans, 1898: 177 (Carter, 1940: 388).

MELIBOEITHON Obenberger
Meliboeithon Obenberger, 1920b: 170.

Meliboeithon intermedium (Kerremans) (Map 241)
Paracephala intermedia Kerremans, 1898: 177.
Meliboeithon intermedium (Kerremans) (Bellamy, 1988: 434).
Meliboeithon fissus Obenberger, 1920b: 171 (Bellamy, 1988: 434).

DINOCEPHALIA Obenberger
Dinocephalia Obenberger, 1923a: 39.
Pseudosynechocera Obenberger, 1943: 33.

Dinocephalia burnsi Bellamy (Map 242)
Dinocephalia burnsi Bellamy, 1988: 449.

Dinocephalia cyaneipennis (Blackburn) (Map 243)
Paracephala cyaneipennis Blackburn, 1893: 130.
Dinocephalia cyaneipennis (Blackburn) (Bellamy, 1988: 445).

Dinocephalia thoracica (Kerremans) (Map 244)
Paracephala thoracica Kerremans, 1900: 343.
Dinocephalia thoracica (Kerremans) (Bellamy, 1988: 442).
Dinocephalia gigantea Obenberger, 1923a: 40 (Bellamy, 1988: 442).

Dinocephalia transsecta (Carter) (Map 245)
Paracephala transsecta Carter, 1921: 306.
Dinocephalia transsecta (Carter) (Bellamy, 1988: 446).
Paracephala impressicollis Obenberger, 1924 a: 155. Bellamy, 1988: 447).

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Alcinous Deyrolle, 1864: 115.
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Alcinous fossicollis (Kerremans) (Map 246)
Cisseis fossicollis Kerremans, 1903a: 229.
Alcinous fossicollis (Kerremans) (Carter and Théry, 1929: 272, 276).

Alcinous nodosus Kerremans (Map 247)
Alcinous nodosus Kerremans, 1898: 175.
Alcinous minor Kerremans, 1898: 176.

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Cisseis Gory and Laporte, 1839: 1.
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Coraebus auctorum.

Cisseis acuducta (Kirby) (Map 248)
Trachys acuducta Kirby, 1837: 162.
Cisseis acuducta (Kirby) (Saunders, 1868b: 60).
Ethon marmoreum Gory and Laporte, 1839: 3.
Cisseis aenea Gemminger and Harold, 1869: 1429.
Cisseis cuprifrons Kerremans, 1898: 157.

Cisseis laeta Kerremans, 1903a: 227.

Cisseis constricta Blackburn (Map 249)
Cisseis constricta Blackburn, 1887: 254.
Cisseis lindi Blackburn, 1887: 254.

Cisseis cupreicollis (Hope) (Map 250)
Ethon cupreicolle Hope, 1846: 219.
Cisseis cupreicollis (Hope) (Saunders, 1868b: 58).
Ethon aeneicolle Hope, 1846: 220.
Cisseis morosa Kerremans, 1898: 158.

Cisseis cupripennis (Guérin) (Map 251)
Buprestis cupripennis Guérin, 1830: 65.
Cisseis cupripennis (Guérin) (Gory and Laporte, 1839: 5).

Cisseis duodecimmaculata (Fabricius) (Map 252)
Buprestis duodecimmaculata Fabricius, 1801: 191.
Cisseis duodecimmaculata (Fabricius) (Saunders, 1871: 103).
Buprestis duodecimguttata Boisduval, 1835: 93.
Cisseis quatuordecimnotata Hope, 1846: 218.
Cisseis xanthosticta Saunders, 1871: 103.
Cisseis pustulata Thomson, 1879a: 51.
Cisseis duodecimmaculata var. *fallaciosula* Obenberger, 1935a: 36.

Cisseis fulgidicollis Macleay (Map 253)
Cisseis fulgidicollis Macleay, 1888: 1231.

Cisseis leucosticta (Kirby) (Map 254)
Buprestis leucosticta Kirby, 1818a: 382.
Cisseis leucosticta (Kirby) (Saunders, 1868b: 57).
Cisseis stellulata Dalman, 1823: 54.
Cisseis stellatula Kerremans, 1892: 225 (lapsus).
Cisseis fulgidifrons Kerremans, 1898: 161.

Cisseis marmorata Gory and Laporte (Map 255)
Cisseis marmorata Gory and Laporte, 1839: 4.
Cisseis similis Saunders. 1868b: 59.
Cisseis viridicollis Thomson, 1879a: 50.
Cisseis aenea Kerremans, 1898: 158 .
Cisseis marmorata var. *prasina* Carter, 1923a: 168.

Cisseis minutissima Thomson (Map 256)
Cisseis minutissima Thomson, 1879a: 54.

Cisseis nitidicollis Kerremans (Map 257)
Cisseis nitidicollis Kerremans, 1898: 162.

Cisseis nitidiventris Carter (Map 258)
Cisseis nitidiventris Carter, 1934: 260.

Cisseis notulata (Germar) (Map 259)
Ethon notulatum Germar, 1848: 178.
Cisseis notulata (Germar) (Saunders, 1871: 103).
Cisseis notula Kerremans, 1892: 226 (Obenberger, 1935b: 850).
Cisseis inops Kerremans, 1898: 168.
Cisseis nigrita Kerremans, 1898: 168.
Cisseis semiobscura Kerremans, 1898: 170.
Cisseis violacea Kerremans, 1903a: 228.

Cisseis nubeculosa (Germar) (Map 260)
Ethon nubeculosum Germar, 1848: 176.
Cisseis nubeculosa (Germar) (Saunders, 1871: 103).
Ethon chalcopterum Germar, 1848: 177.

Cisseis parva Blackburn (Map 261)
Cisseis parva Blackburn, 1887: 253.
Cisseis simplex Kerremans, 1898: 171.

Cisseis puella Kerremans (Map 262)
Cisseis puella Kerremans, 1898: 170.
Cisseis curta Kerremans, 1903a: 229.

Cisseis pygmaea Blackburn (Map 263)
Cisseis pygmaea Blackburn, 1891: 299.

Cisseis roseocuprea (Hope) (Map 264)
Ethon roseocupreum Hope, 1846: 219.
Cisseis roseocuprea (Hope) (Saunders, 1868b: 61).
Cisseis impressicollis Macleay, 1872: 248.
Cisseis dispar Blackburn, 1891: 297.
Cisseis fairmairei Kerremans, 1898: 169.
Cisseis cuprea Kerremans, 1903a: 228.

Cisseis rubicunda Kerremans (Map 265)
Cisseis rubicunda Kerremans, 1898: 169.
Cisseis modesta Kerremans, 1898: 170.

Cisseis scabrosula Kerremans (Map 266)
Cisseis scabrosula Kerremans, 1898: 167.

Cisseis subbifascialis Carter (Map 267)
Cisseis subbifascialis Carter, 1927: 229.
Cisseis subbifasciata Carter, 1929: 279 (lapsus).

Cisseis uniformis Thomson (Map 268)
Cisseis uniformis Thomson, 1879a: 53.
Cisseis coraeboides Kerremans, 1898: 166.

Cisseis vicina Kerremans (Map 269)
Cisseis vicina Kerremans, 1898: 164.
Cisseis collaris Kerremans, 1903a: 229.
Cisseis ornata Kerremans, 1903a: 229.

Cisseis viridiceps Kerremans (Map 270)
Cisseis viridiceps Kerremans, 1898: 168.
Cisseis oblonga Kerremans, 1903a: 229.

Cisseis westwoodi (Gory and Laporte) (Map 271)
Coreabus westwoodi Gory and Laporte, 1839: 15.
Cisseis westwoodi (Gory and Laporte) (Saunders, 1871: 103).
Cisseis verna Blackburn, 1891: 299.
Cisseis viridana Kerremans, 1898: 165.
Cisseis theryi Kerremans, 1903a: 229.

PACHYCISSEIS Théry
Pachycisseis Théry, 1929: 268 (to genus: Bellamy, 1988: 417).

Pachycisseis bicolor (Gory and Laporte) (Map 272)
Ethon bicolor Gory and Laporte, 1839: 3.

NEOSPADES Blackburn
Neospades Blackburn, 1887: 251 (to genus: Bellamy, 1988: 417).

Neospades chrysopygia (Germar) (Map 273)
Coraebus chrysopygius Germar, 1848: 178.
Cisseis dimidiata Macleay, 1872: 248.
Cisseis semirugosa Thomson, 1879a: 51.
Cisseis semiscabrosa Thomson, 1879a: 53.
Cisseis apicalis Macleay, 1888: 1232.
Cisseis purpureotincta Macleay, 1888: 1232.

Neospades simplex Blackburn
Neospades simplex Blackburn, 1888: 861.
Cisseis nigripennis Macleay, 1888: 1231.
Cisseis bella Blackburn, 1891: 298.
Cisseis ignicollis Kerremans, 1898: 164.

HYPOCISSEIS Thomson
Hypocisseis Thomson,1879a: 49.
Maschaliz Waterhouse, 1887b: 293.
Cisseoides Kerremans, 1893: 118.
Brachycisseis (part) Théry, 1931: 26.
Coroebus auctorum.

Hypocisseis minuta Carter (Map 274)
Hypocisseis minuta Carter, 1923a: 175.

Hypocisseis ornata Carter (Map 275)
Hypocisseis ornata Carter, 1923a: 175.

Hypocisseis suturalis (Saunders) (Map 276)
Cisseis suturalis Saunders, 1868b: 60.
Hypocisseis suturalis (Saunders) (Carter, 1923a: 174).
Coraebus marmoratus Macleay, 1872: 248.
Cisseoides albopicta Kerremans, 1898: 171.
Hypocisseis aeneipes Kerremans, 1898: 173.

ETHON Gory and Laporte
Ethon Gory and Laporte, 1839: 1.

Ethon affine Gory and Laporte (Map 277)
Ethon affine Gory and Laporte, 1839: 4.
Diphucrania reichei Chevrolat, 1838: 82.
Ethon proximum Boheman, 1858: 63.

Ethon aurifluum Saunders, 1868b: 56.
Ethon purpurascens Saunders, 1868b: 56.
The publication date of Gory and Laporte's monograph is uncertain (Bellamy, 1985; Gardner, 1990) but Chevrolat's paper, often cited as being published in 1837, bears the year 1838 on the title page (von Hayek, pers. comm.). *Ethon affine* is used here for the sake of stability although *reichei* is the senior epithet.

Ethon corpulentum Boheman (Map 278)
Ethon corpulentum Boheman, 1858: 62 (replacement name).
Buprestis fissiceps Laporte and Gory, 1839: 4 (preocc.).

Ethon fissiceps (Kirby) (Map 279)
Buprestis fissiceps Kirby, 1818b: 458.
Ethon fissiceps (Kirby) (Gory and Laporte, 1839: 4).
Ethon viride Gory and Laporte, 1839: 6.
Ethon diversum Kerremans, 1898: 156.

Ethon leai Carter (Map 280)
Ethon leai Carter, 1924a: 26.

Ethon maculatum Blackburn (Map 281)
Ethon maculatus Blackburn, 1887: 250.

Tribe AGRILINI

AGRILUS Curtis
Agrilus Curtis, 1825, No. 67.
Anambus Thomson, 1864: 38.
Engyaulus Waterhouse, 1889: 50.
Teres Harris, 1829: 2.
Uragrilus Semenov-Tian-Shianskij, 1935: 276.
Paradomorphus Waterhouse, 1887a: 183.

Agrilus australasiae Gory and Laporte (Map 282)
Agrilus australasiae Gory and Laporte, 1839: 21.
Agrilus hypoleucus Gory and Laporte, 1839: 37.
Agrilus assimilis Hope, 1846: 217.
Agrilus purpuratus Hope, 1846: 217.
Agrilus flavo-taeniatus Thomson, 1879a: 73.
Agrilus hypoleucus ssp. *cooki* Obenberger, 1923b: 77.
Agrilus hypoleucus ssp. *tasmanicus* Obenberger, 1923b: 77.
Agrilus danesi Obenberger, 1923b: 79.
Agrilus domini Obenberger, 1923b: 78.
Agrilus raphelisi Obenberger, 1923b: 78.
Agrilus vandiemeni Obenberger, 1923b: 78.

Agrilus deauratus Macleay (Map 283)
Agrilus deauratus Macleay, 1872: 249.

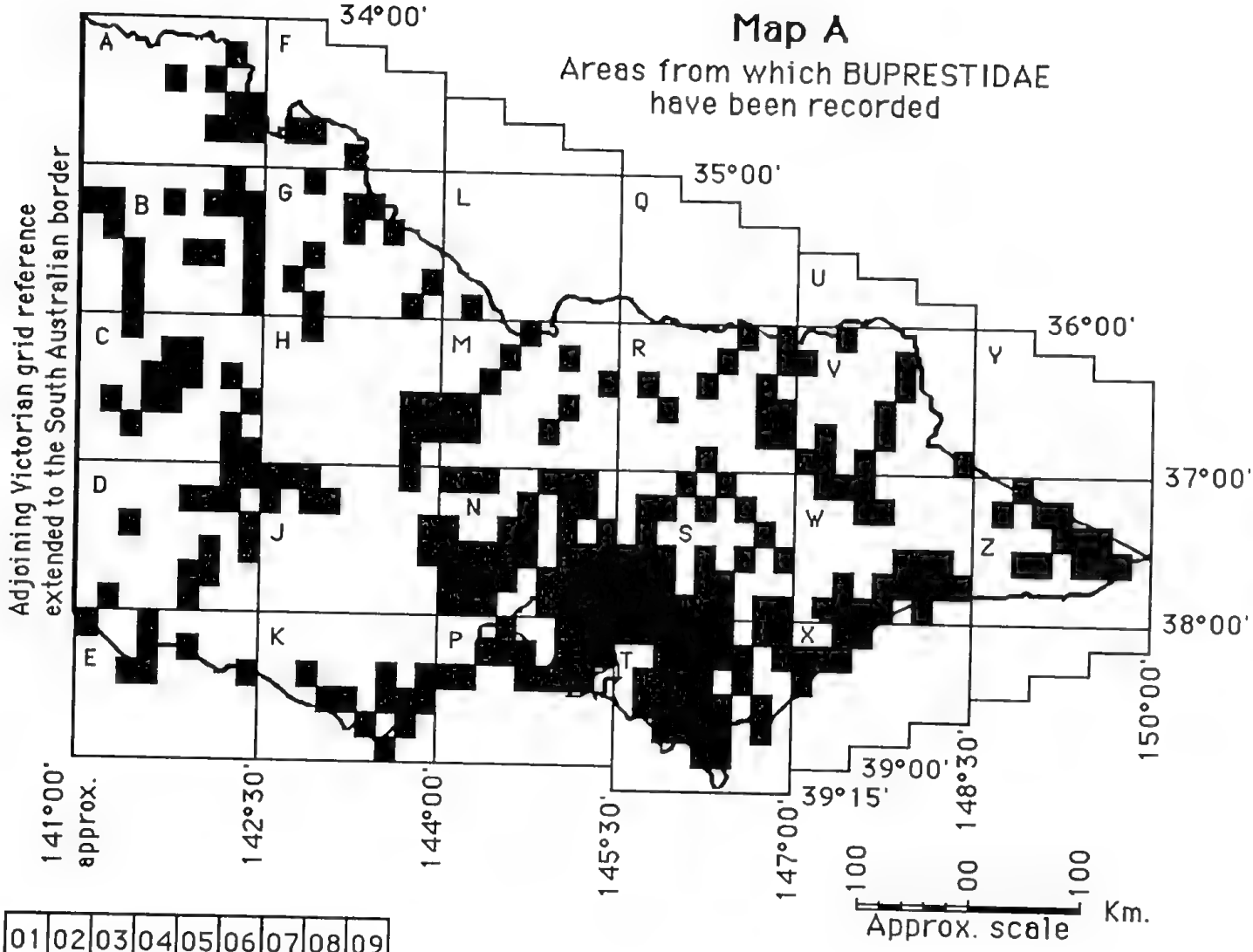
Agrilus frenchi Blackburn
Agrilus frenchi Blackburn, 1891: 302.

Subfamily **TRACHYINAE** Gory and Laporte
Trachysites Gory and Laporte, 1840: 1.
Traches Carter and Théry, 1929: 269.

Tribe GERMARICINI Cobos
Germaricini Cobos, 1979: 428.

GERMARICA Blackburn
Germarica Blackburn, 1887: 257.

Germarica lilliputana (Thomson) (Map 284)
Aphanisticus lilliputanus Thomson, 1879a: 75.
Germarica lilliputana (Thomson) (Carter, 1924a: 30).
Germarica casuarinae Blackburn, 1887: 257.



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19	20	21	22	23	24	25	26	27
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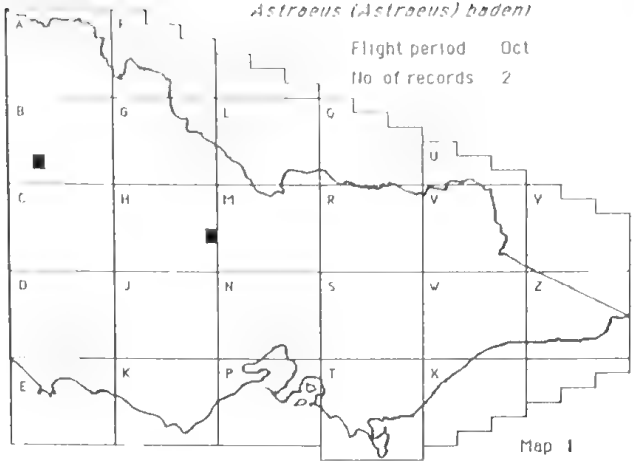
37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54
55	56	57	58	59	60	61	62	63

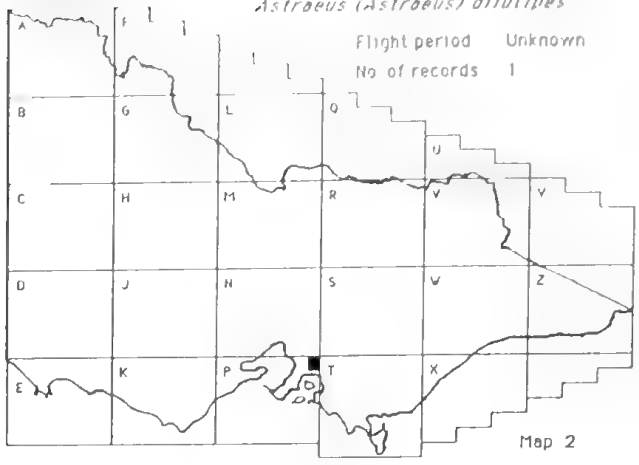
Numbers 55-64 refer to the 'T' block area only.

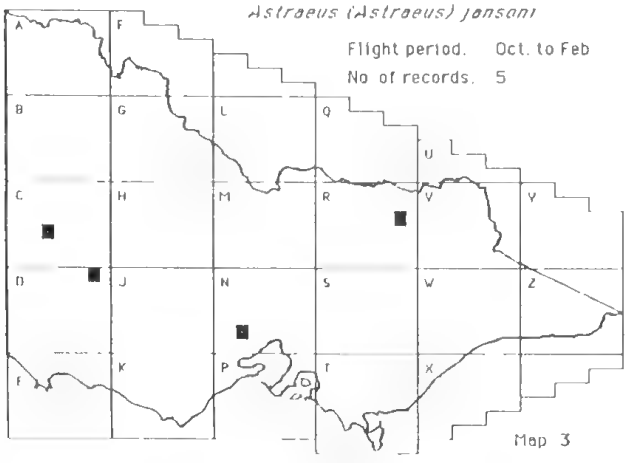
Map A. Areas from which Buprestidae have been recorded.

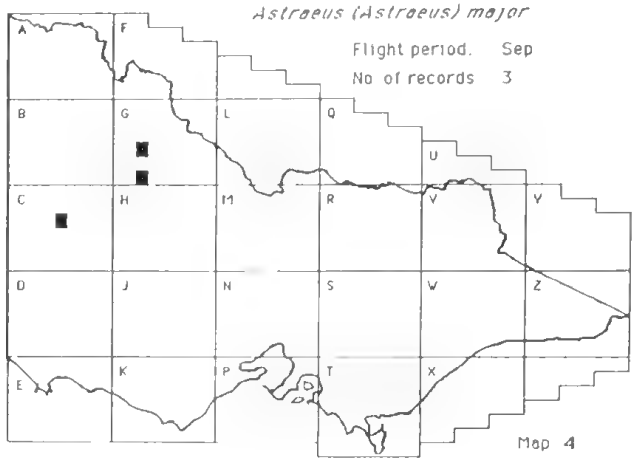
Letter map codes used for the 1:250,000 series R502 maps

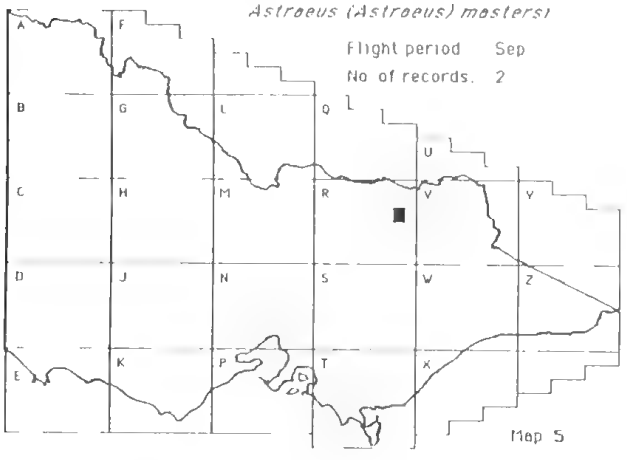
A Mildura — SI 54–11
B Ouyen — SI 54–15
C Horsham — SJ 54–3
D Hamilton — SJ 54–7
E Portland — SJ 54–11
F Belranald — SI 54–12
G Swan Hill — SI 54–16
H St Arnaud — SJ 54–4
J Ballarat — SJ 54–8
K Colac — SJ 54–12
L Deniliquin — SI 55–13
M Bendigo — SJ 55–1
N Melbourne — SJ 55–5
P Queenscliff — SJ 55–9
Q Jerilderie — SI 55–14
R Wangaratta — SJ 55–2
S Warburton — SJ 55–6
T Warragul — SJ 55–10
U Wagga Wagga — SL 55–15
V Tallangatta — SJ 55–3
W Bairnsdale — SJ 55–7
X Sale — SJ 55–11
Y Bega — SJ 55–5
Z Mallacoota — SJ 55–8

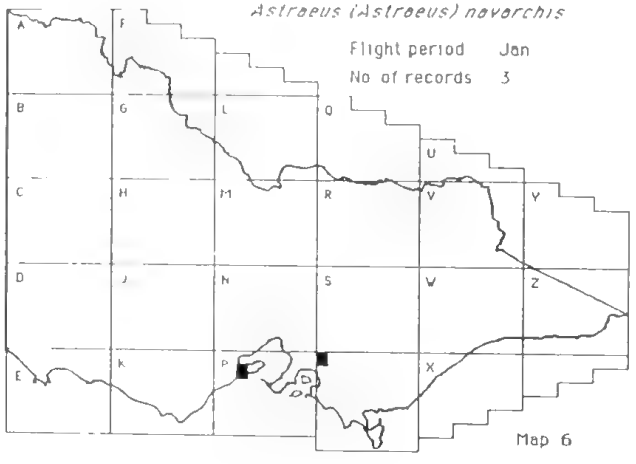

Astraeus (Astraeus) hoeni
Flight period Oct
No of records 2
Map 1

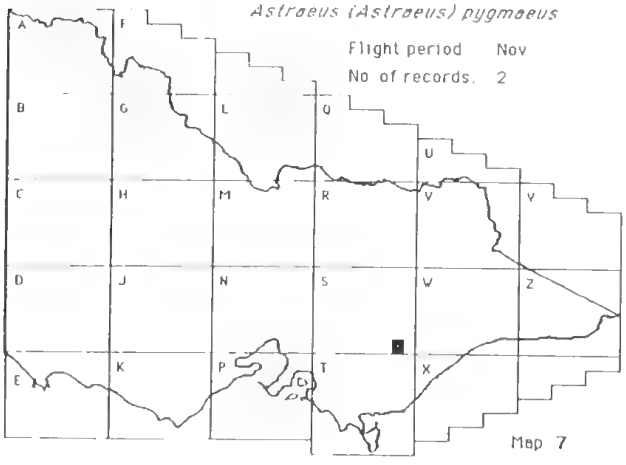

Astraeus (Astraeus) oblitipes
Flight period Unknown
No of records 1
Map 2

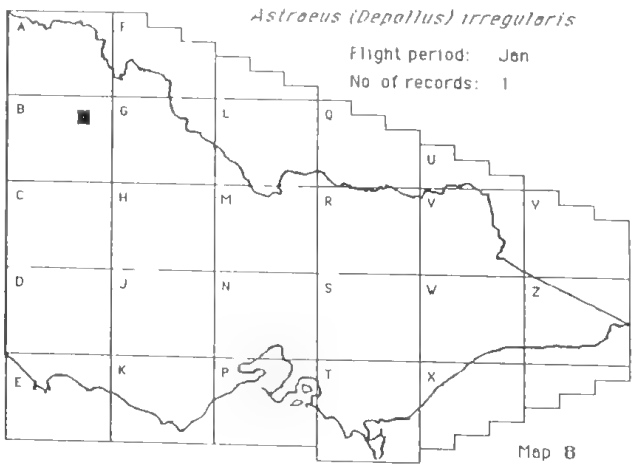

Astraeus (Astraeus) jansoni
Flight period. Oct. to Feb
No of records. 5
Map 3


Astraeus (Astraeus) major
Flight period. Sep
No of records 3
Map 4


Astraeus (Astraeus) mastersi
Flight period Sep
No of records. 2
Map 5

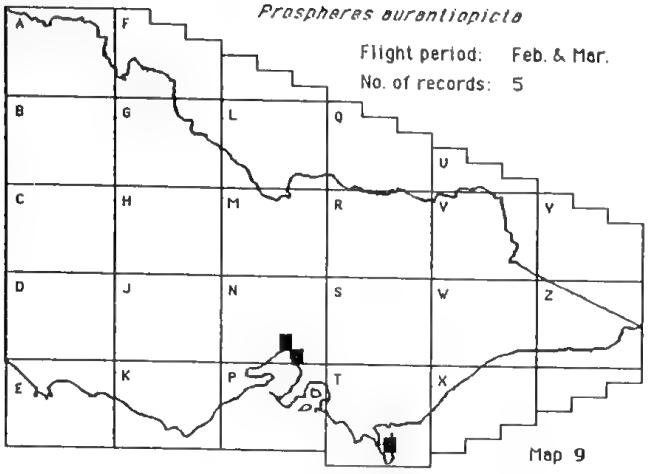

Astraeus (Astraeus) novarchis
Flight period Jan
No of records 3
Map 6


Astraeus (Astraeus) pygmaeus
Flight period Nov
No of records. 2
Map 7


Astraeus (Depallus) irregularis
Flight period: Jan
No of records: 1
Map 8

Prospheres aurantiopicta

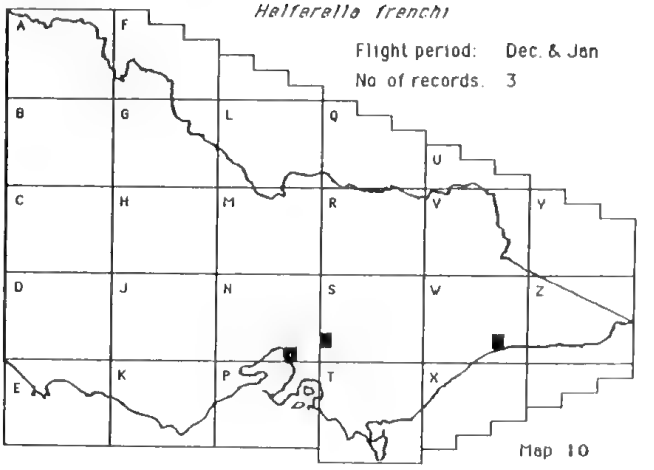
Flight period: Feb. & Mar.
No. of records: 5



Map 9

Helferella frenchi

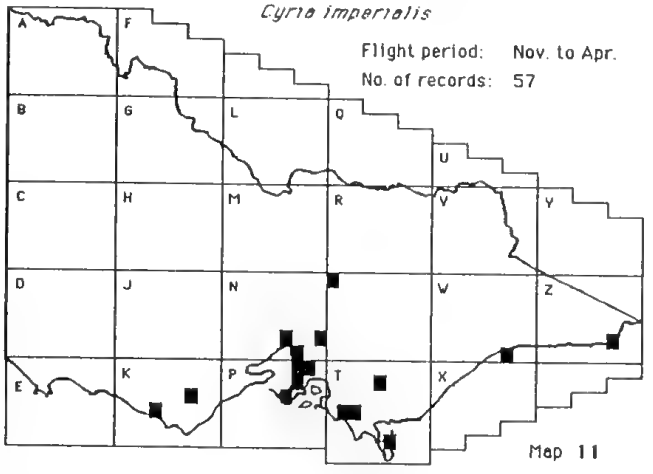
Flight period: Dec. & Jan
No. of records: 3



Map 10

Cyria imperialis

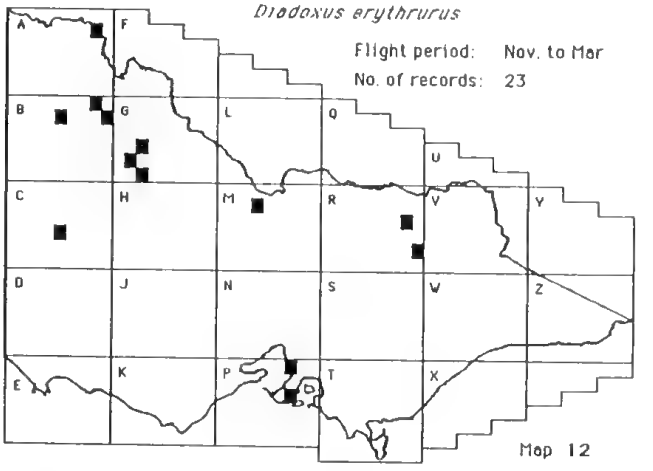
Flight period: Nov. to Apr.
No. of records: 57



Map 11

Diadoxus erythrurus

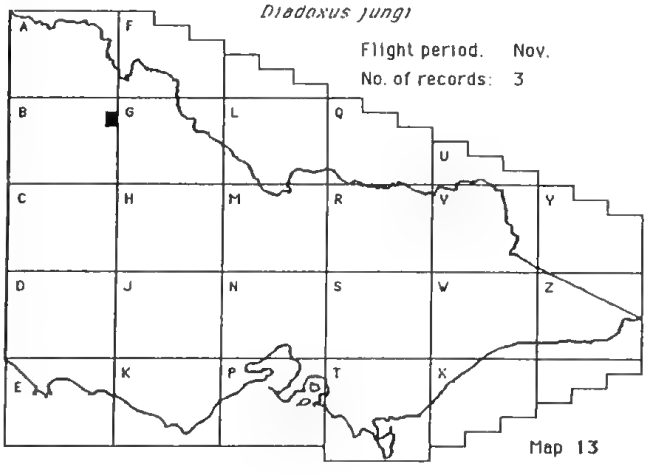
Flight period: Nov. to Mar
No. of records: 23



Map 12

Diadoxus jungi

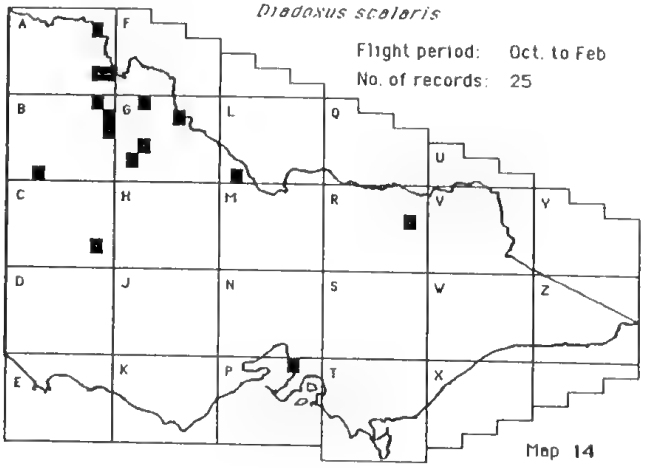
Flight period: Nov.
No. of records: 3



Map 13

Diadoxus scalaris

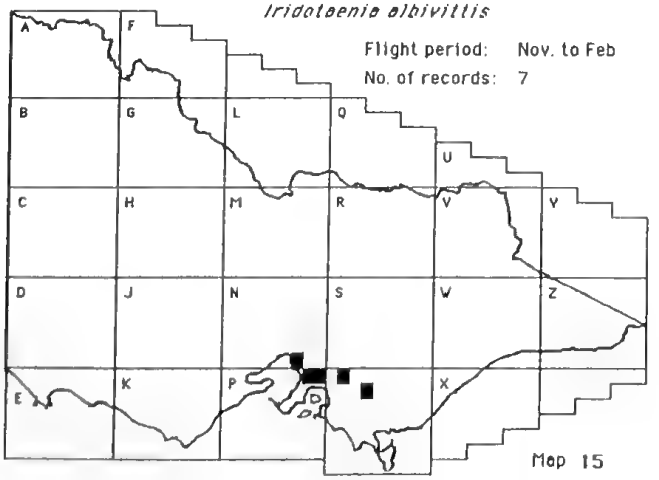
Flight period: Oct. to Feb
No. of records: 25



Map 14

Iridotaenia albivittis

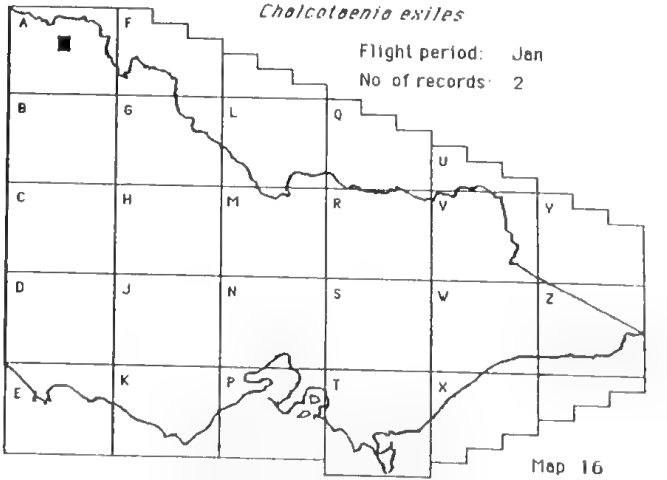
Flight period: Nov. to Feb
No. of records: 7



Map 15

Chalcotaenia exiles

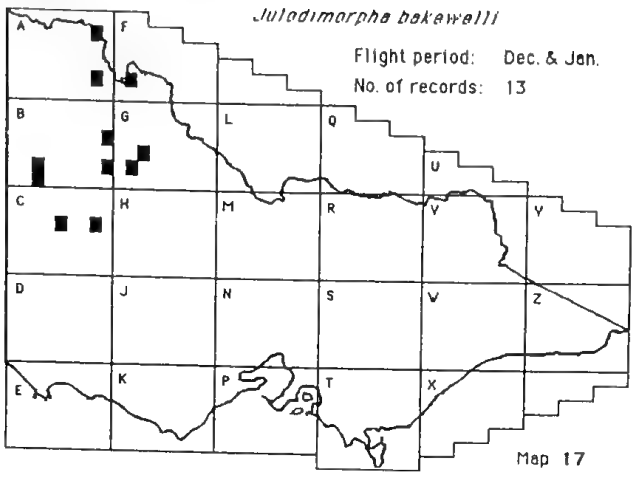
Flight period: Jan
No. of records: 2



Map 16

Julodimorpha bakewelli

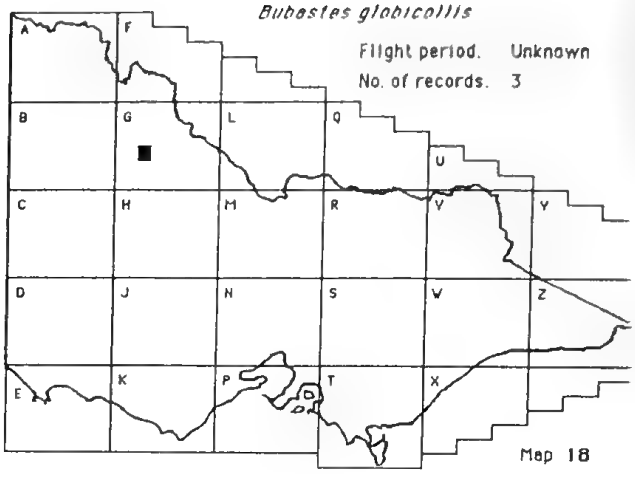
Flight period: Dec. & Jan.
No. of records: 13



Map 17

Bubastes globicollis

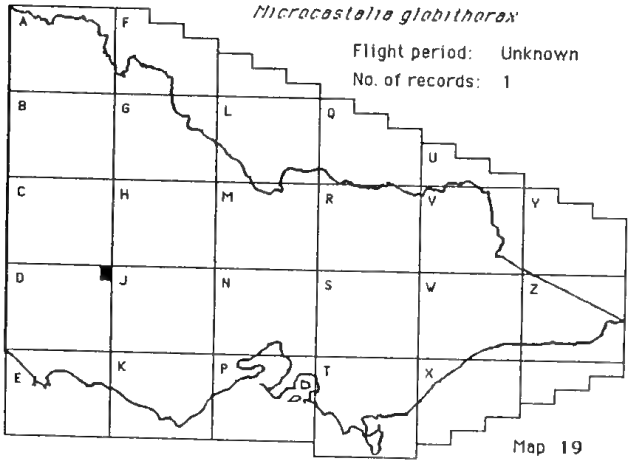
Flight period. Unknown
No. of records. 3



Map 18

Microcastalia globithorax

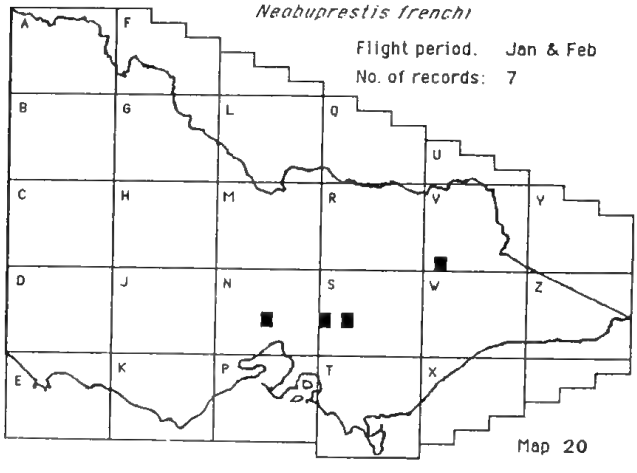
Flight period: Unknown
No. of records: 1



Map 19

Neobuprestis frenchi

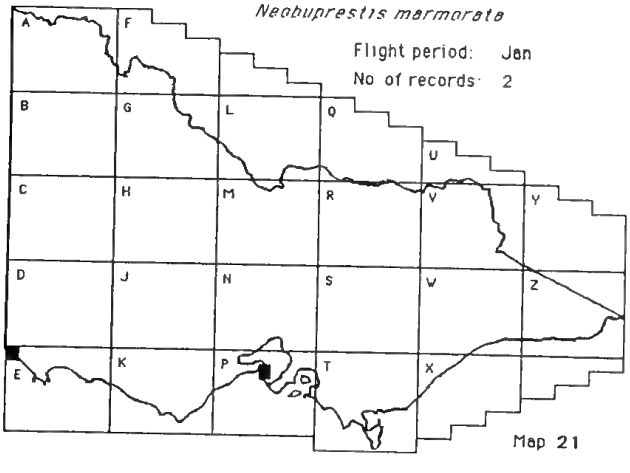
Flight period. Jan & Feb
No. of records: 7



Map 20

Neobuprestis marmorata

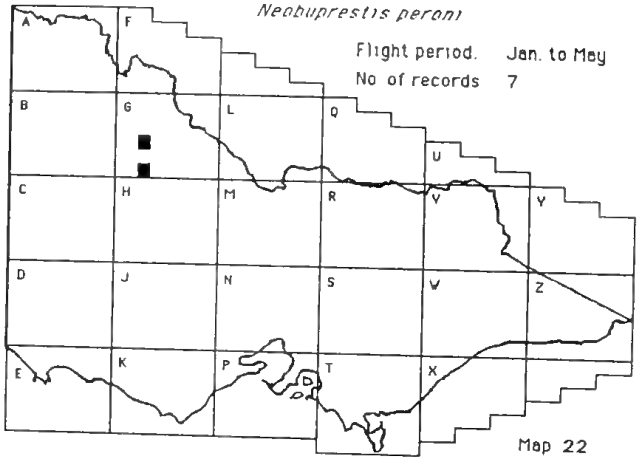
Flight period: Jan
No of records: 2



Map 21

Neobuprestis peroni

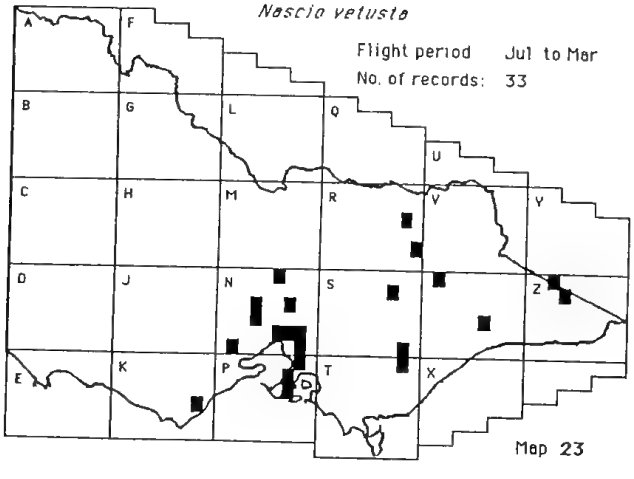
Flight period. Jan. to May
No of records 7



Map 22

Nascio vetusta

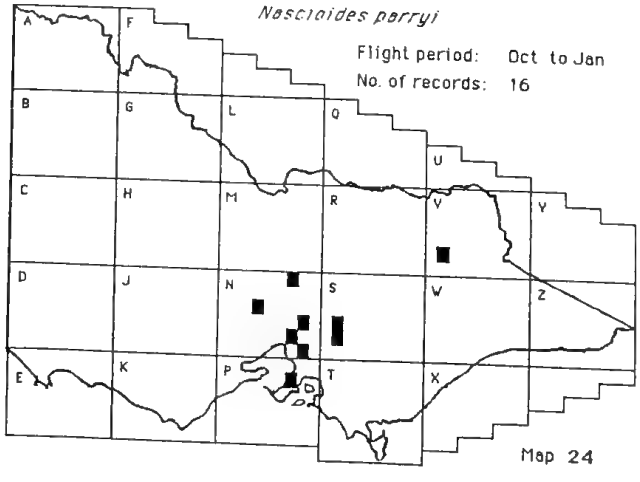
Flight period Jul to Mar
No. of records: 33



Map 23

Nascioides perryi

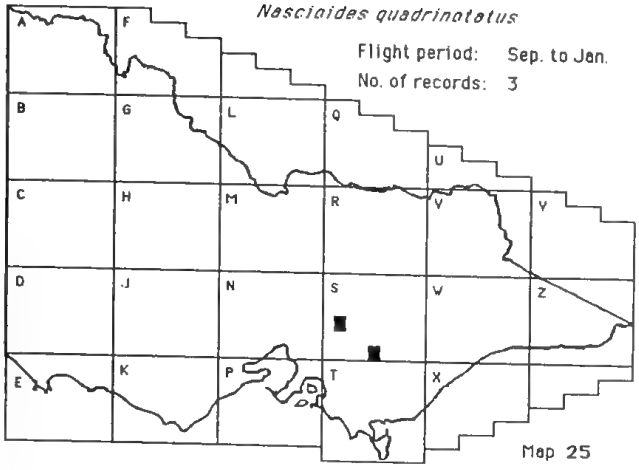
Flight period: Oct to Jan
No. of records: 16



Map 24

Nascioides quadrinotatus

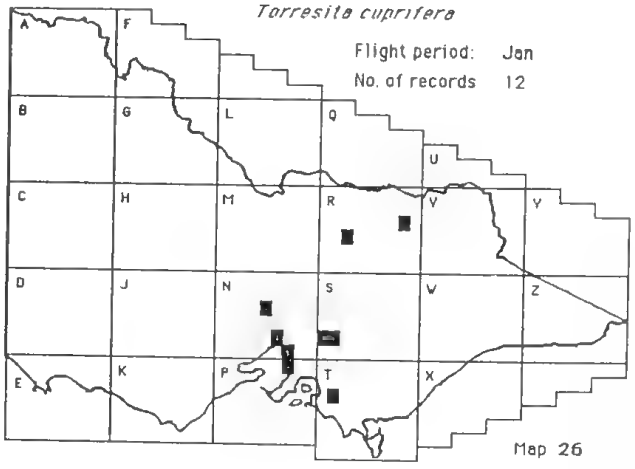
Flight period: Sep. to Jan.
No. of records: 3



Map 25

Torresita cuprifera

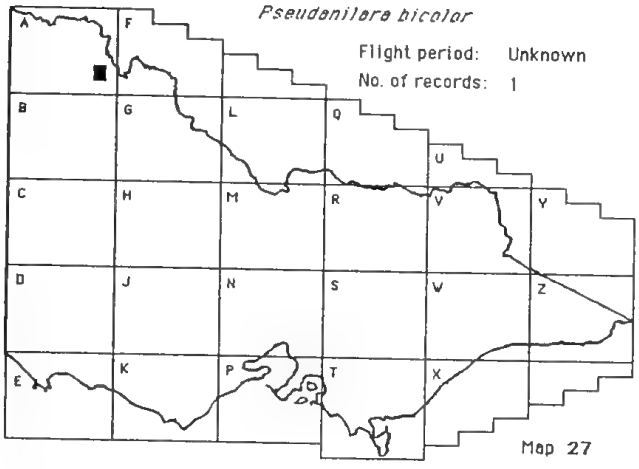
Flight period: Jan
No. of records 12



Map 26

Pseudanilara bicolor

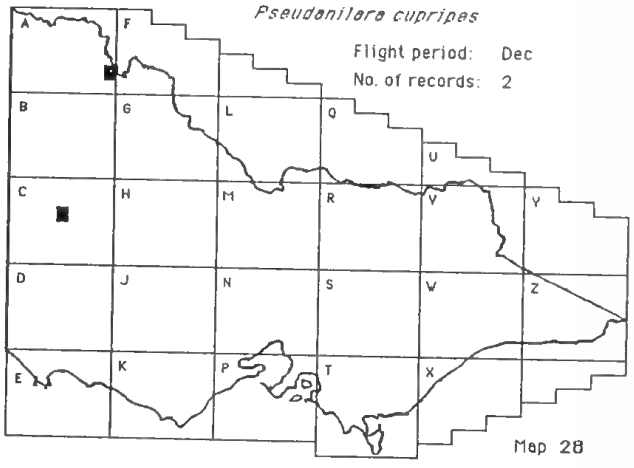
Flight period: Unknown
No. of records: 1



Map 27

Pseudanilara cupripes

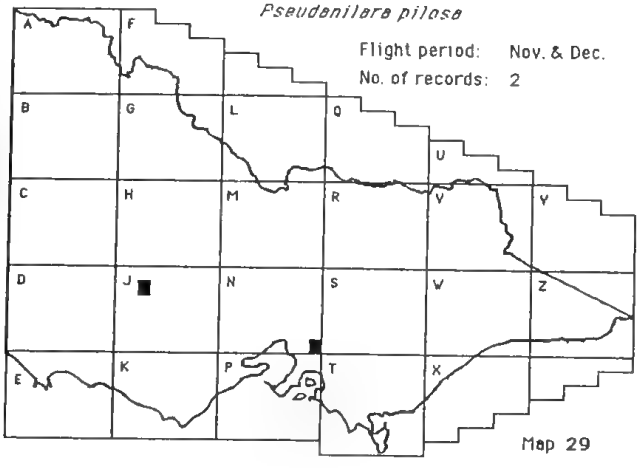
Flight period: Dec
No. of records: 2



Map 28

Pseudanilara pilosa

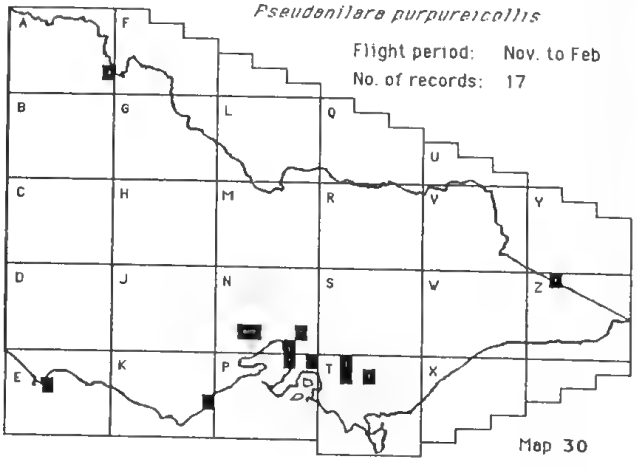
Flight period: Nov. & Dec.
No. of records: 2



Map 29

Pseudanilara purpureicollis

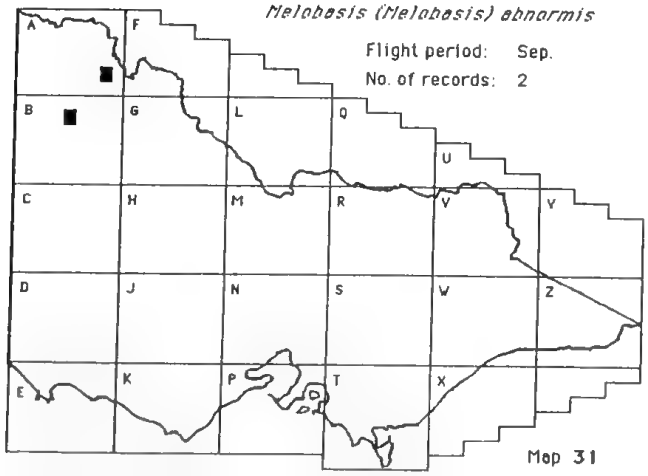
Flight period: Nov. to Feb
No. of records: 17



Map 30

Melobasis (Melobasis) abnormis

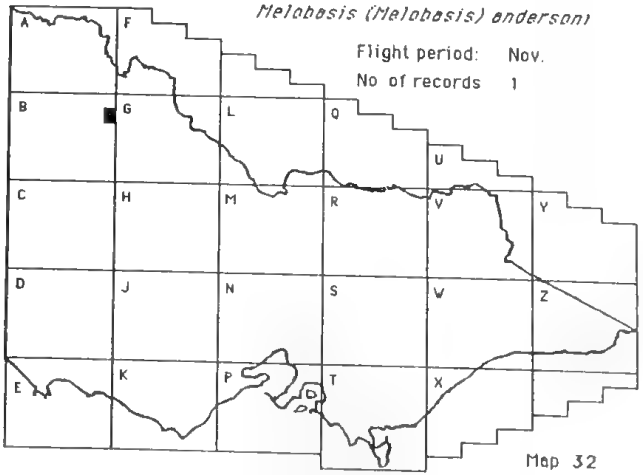
Flight period: Sep.
No. of records: 2



Map 31

Melobasis (Melobasis) andersoni

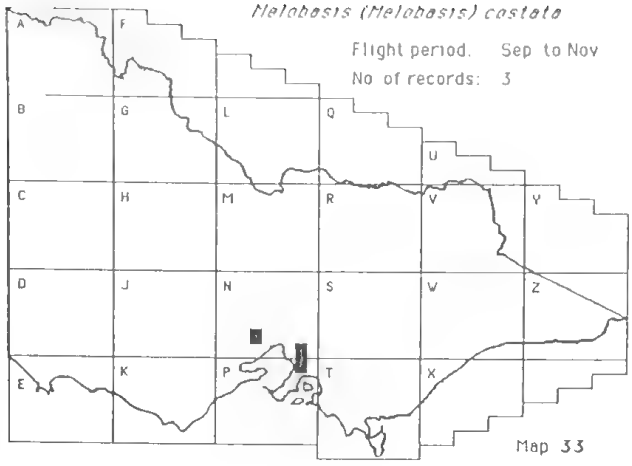
Flight period: Nov.
No of records 1



Map 32

Melobasis (Melobasis) costata

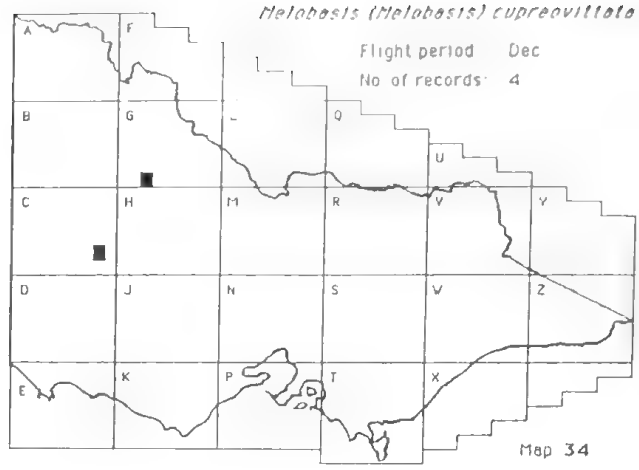
Flight period. Sep to Nov
No of records: 3



Map 33

Melobasis (Melobasis) cupreovittata

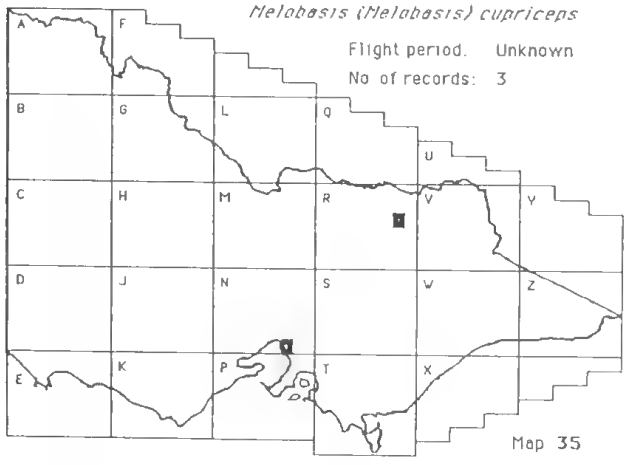
Flight period Dec
No of records: 4



Map 34

Melobasis (Melobasis) cupriceps

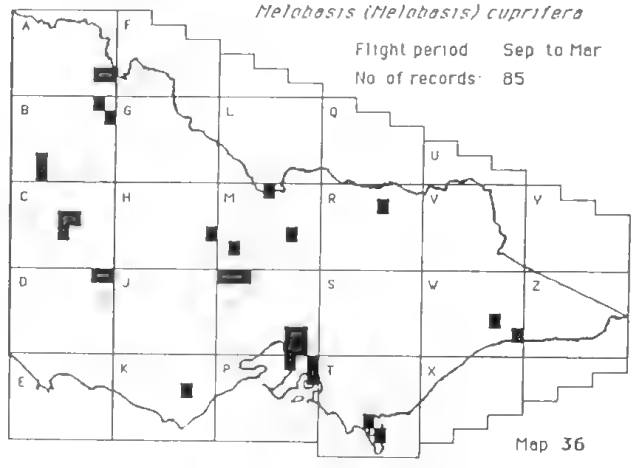
Flight period. Unknown
No of records: 3



Map 35

Melobasis (Melobasis) cuprifera

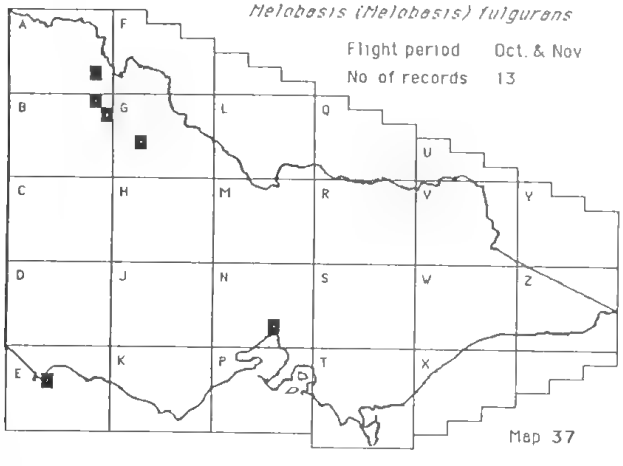
Flight period Sep to Mar
No of records: 85



Map 36

Melobasis (Melobasis) fulgurans

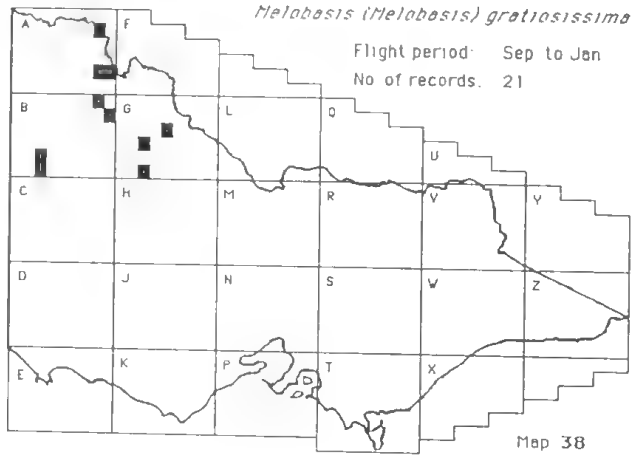
Flight period Oct. & Nov
No of records 13



Map 37

Melobasis (Melobasis) gratiosissima

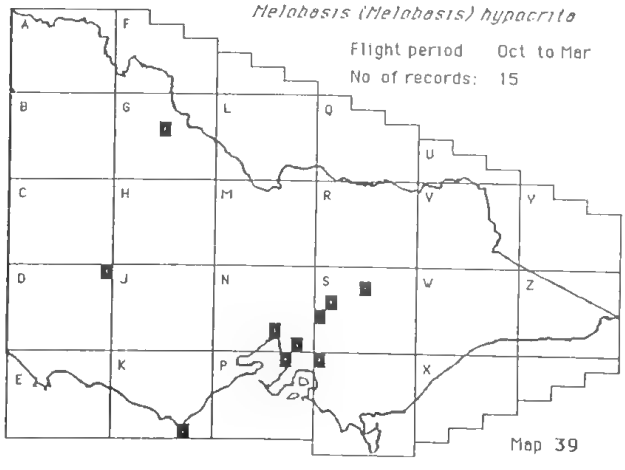
Flight period Sep to Jan
No of records. 21



Map 38

Melobasis (Melobasis) hypocrita

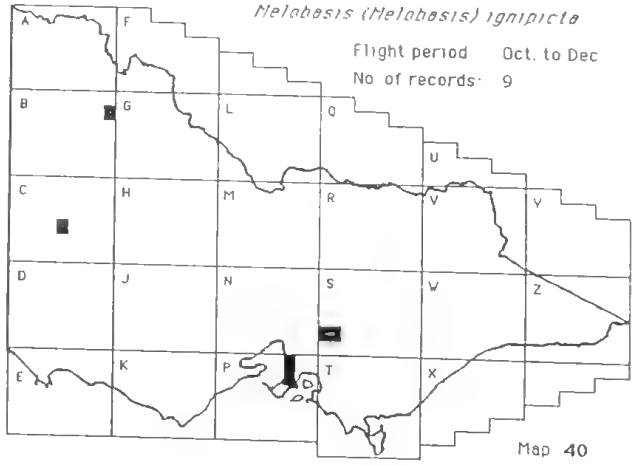
Flight period Oct to Mar
No of records: 15



Map 39

Melobasis (Melobasis) ignipicta

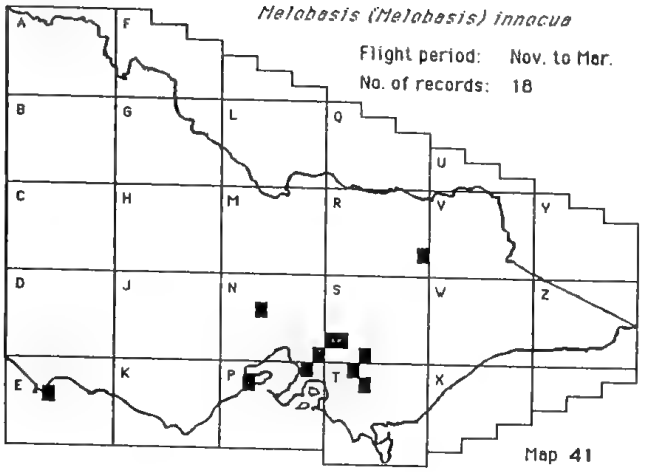
Flight period Oct. to Dec
No of records: 9



Map 40

Melobasis (Melobasis) innocua

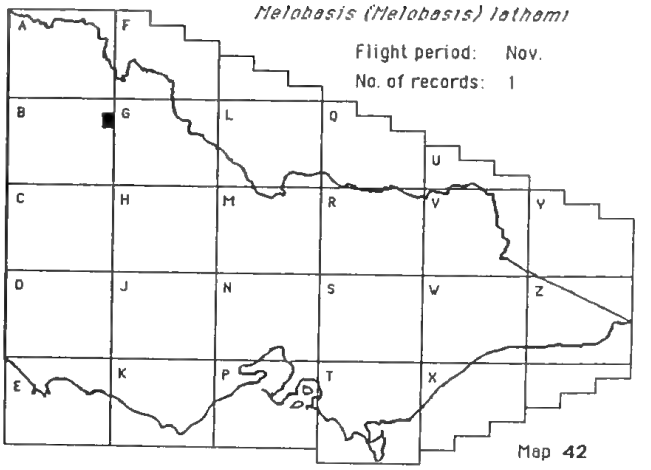
Flight period: Nov. to Mar.
No. of records: 18



Map 41

Melobasis (Melobasis) lathami

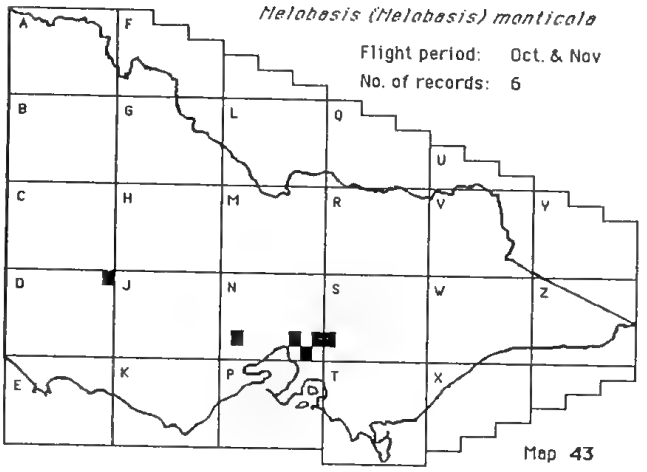
Flight period: Nov.
No. of records: 1



Map 42

Melobasis (Melobasis) monticola

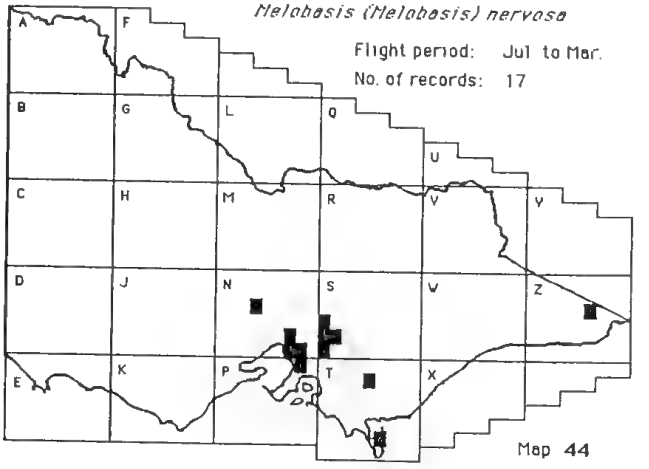
Flight period: Oct. & Nov
No. of records: 6



Map 43

Melobasis (Melobasis) nervosa

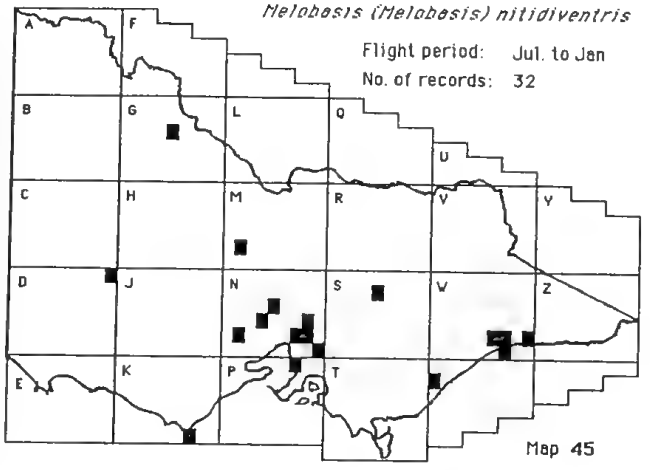
Flight period: Jul. to Mar.
No. of records: 17



Map 44

Melobasis (Melobasis) nitidiventris

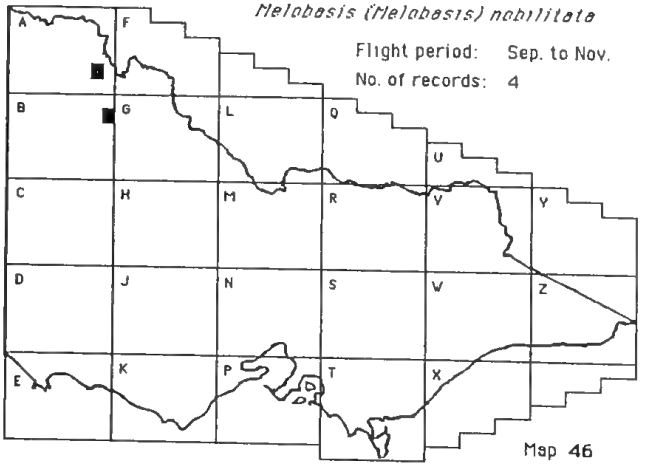
Flight period: Jul. to Jan
No. of records: 32



Map 45

Melobasis (Melobasis) nobilitata

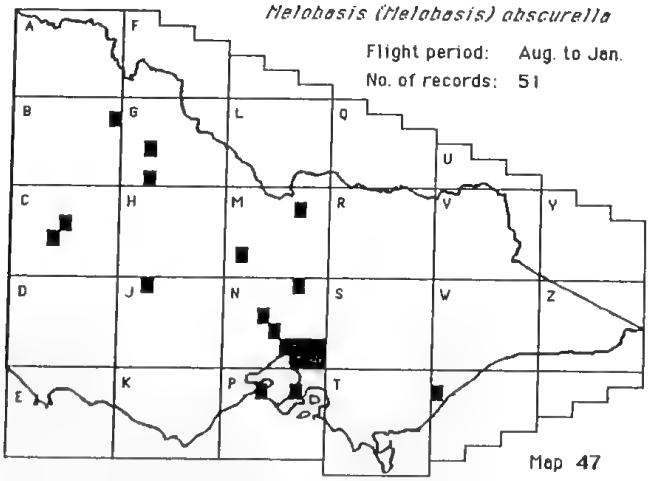
Flight period: Sep. to Nov.
No. of records: 4



Map 46

Melobasis (Melobasis) obscurella

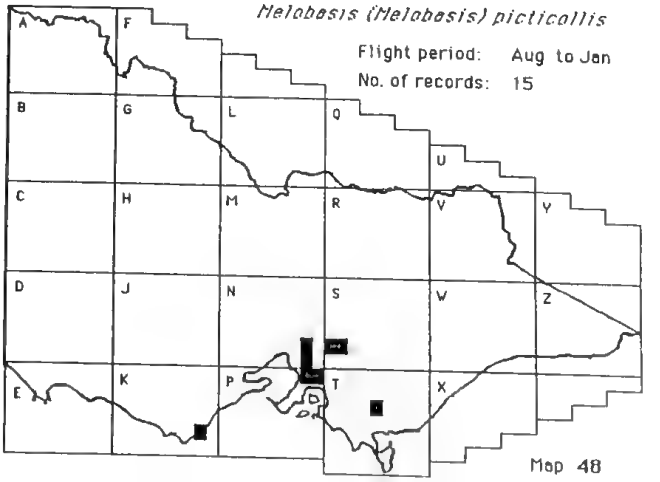
Flight period: Aug. to Jan.
No. of records: 51



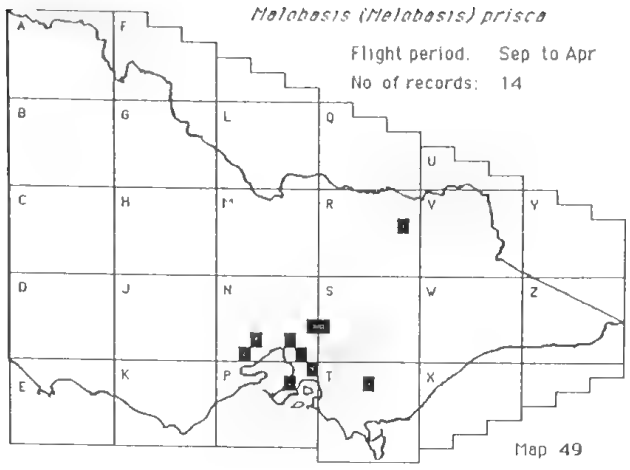
Map 47

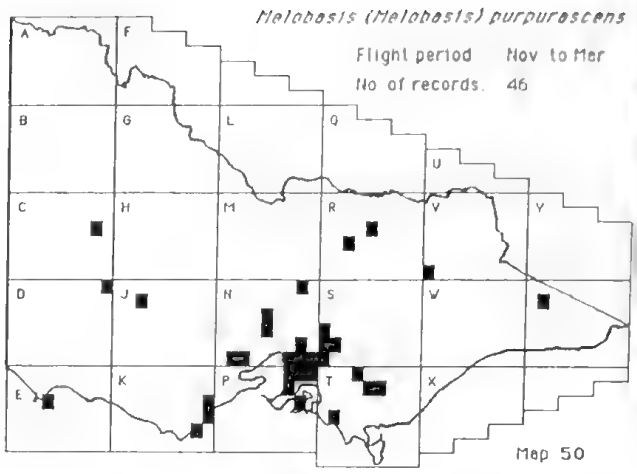
Melobasis (Melobasis) picticollis

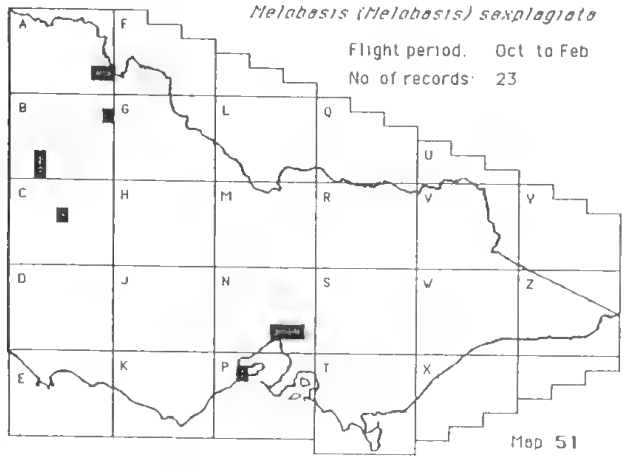
Flight period: Aug. to Jan
No. of records: 15

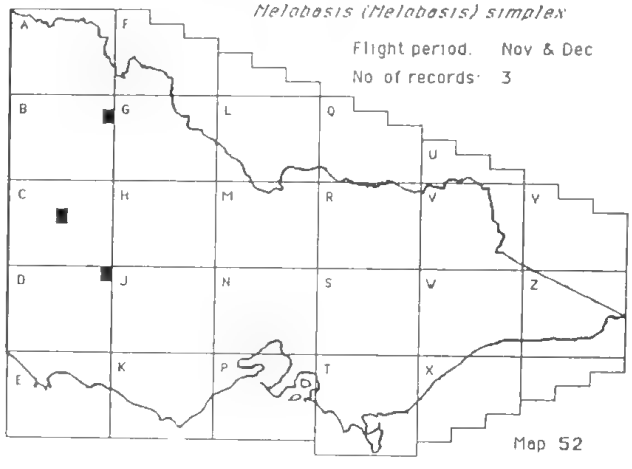


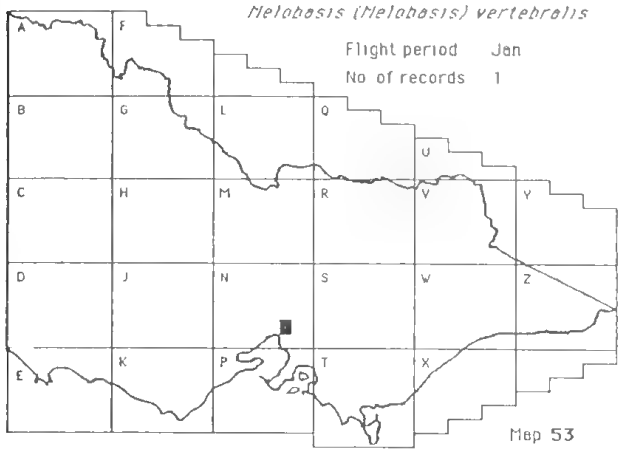
Map 48

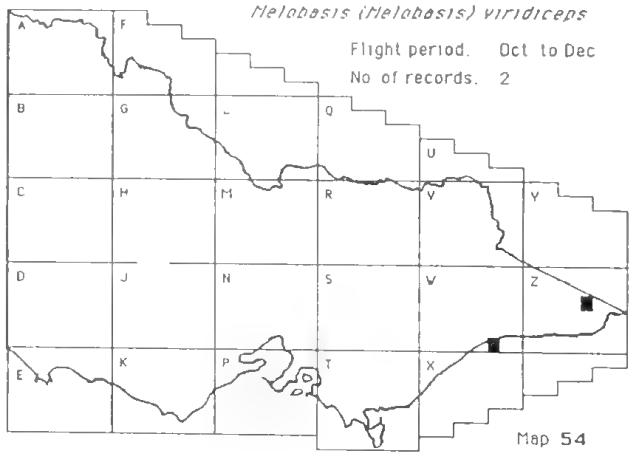

Melobasis (Melobasis) prisca
Flight period. Sep to Apr
No of records: 14
Map 49

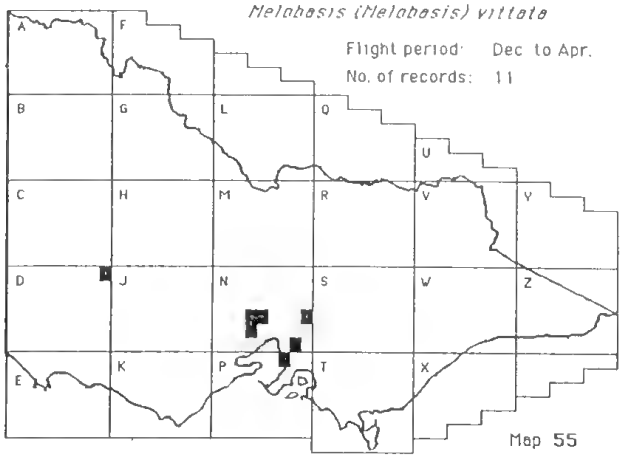

Melobasis (Melobasis) purpurascens
Flight period Nov to Mar
No of records. 46
Map 50

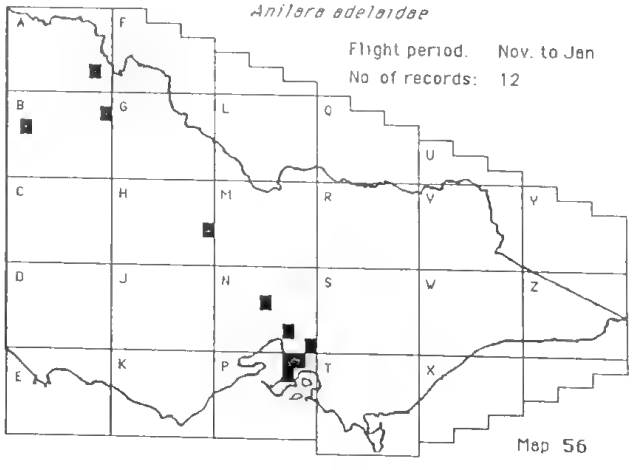

Melobasis (Melobasis) sexplagiata
Flight period. Oct to Feb
No of records 23
Map 51


Melobasis (Melobasis) simplex
Flight period. Nov & Dec
No of records 3
Map 52


Melobasis (Melobasis) vertebralis
Flight period Jan
No of records 1
Map 53

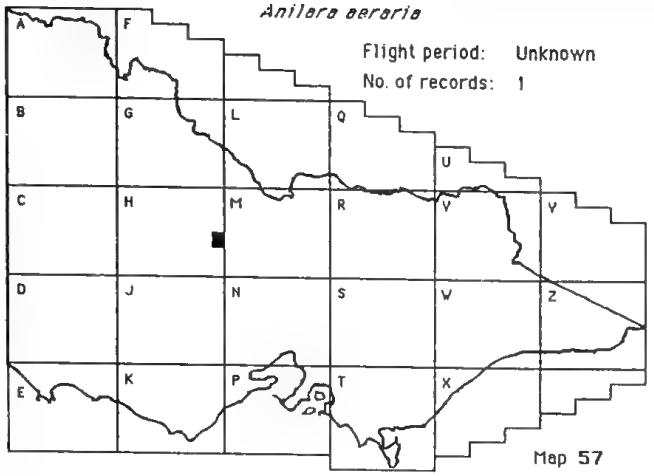

Melobasis (Melobasis) viridiceps
Flight period. Oct to Dec
No of records. 2
Map 54


Melobasis (Melobasis) vittata
Flight period Dec to Apr.
No. of records: 11
Map 55


Anilara adelaidae
Flight period. Nov. to Jan
No of records: 12
Map 56

Anilara aerata

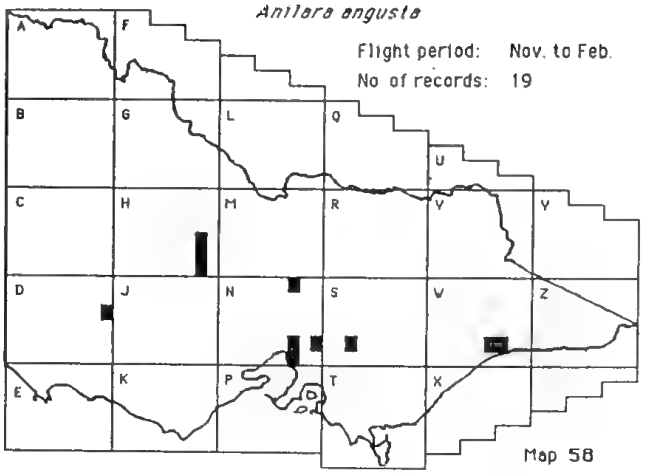
Flight period: Unknown
No. of records: 1



Map 57

Anilara angusta

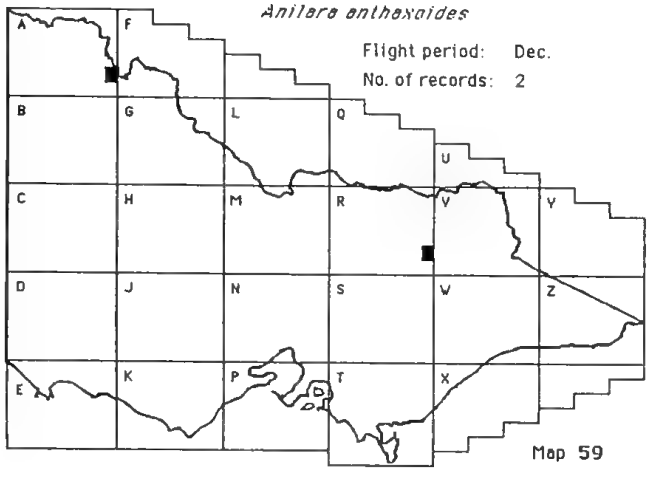
Flight period: Nov. to Feb.
No of records: 19



Map 58

Anilara anthaxoides

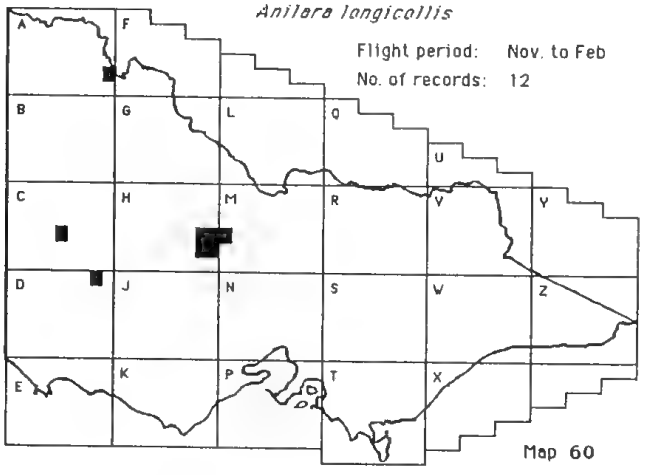
Flight period: Dec.
No. of records: 2



Map 59

Anilara longicollis

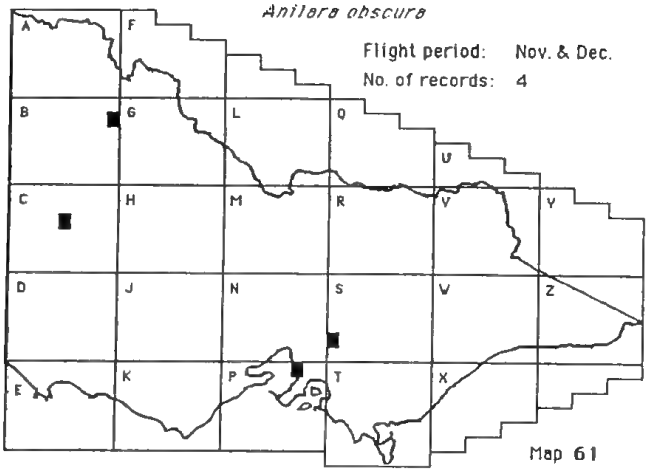
Flight period: Nov. to Feb
No. of records: 12



Map 60

Anilara obscura

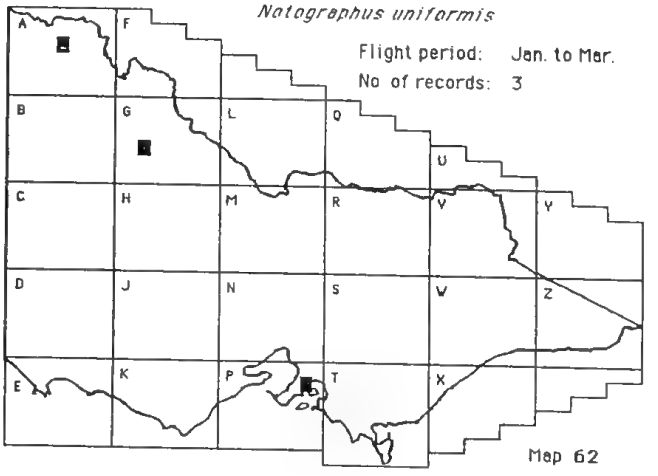
Flight period: Nov. & Dec.
No. of records: 4



Map 61

Notographus uniformis

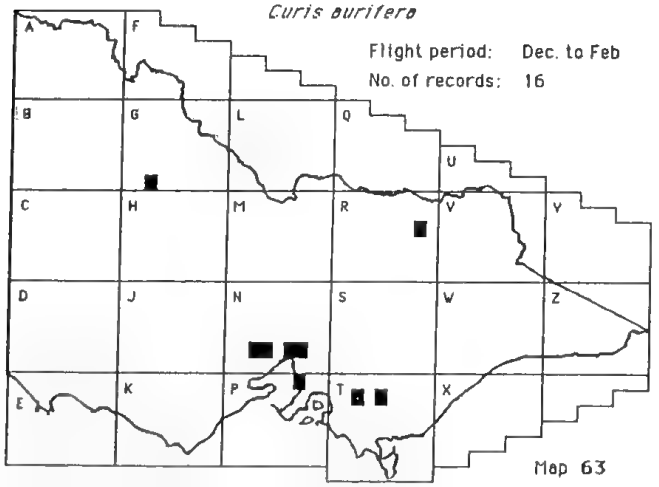
Flight period: Jan. to Mar.
No of records: 3



Map 62

Curis aurifera

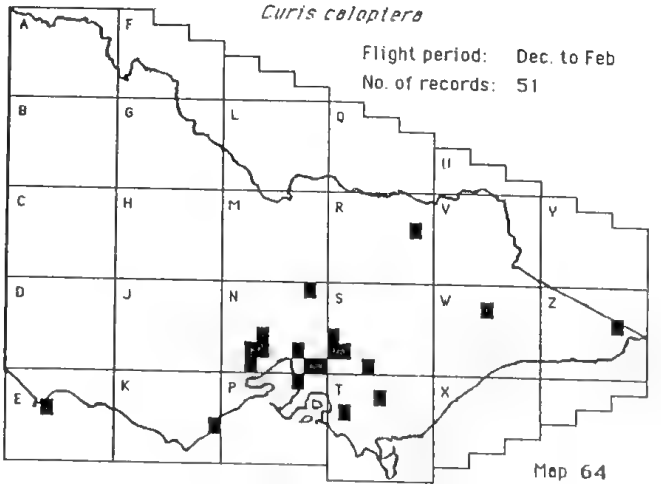
Flight period: Dec. to Feb
No. of records: 16



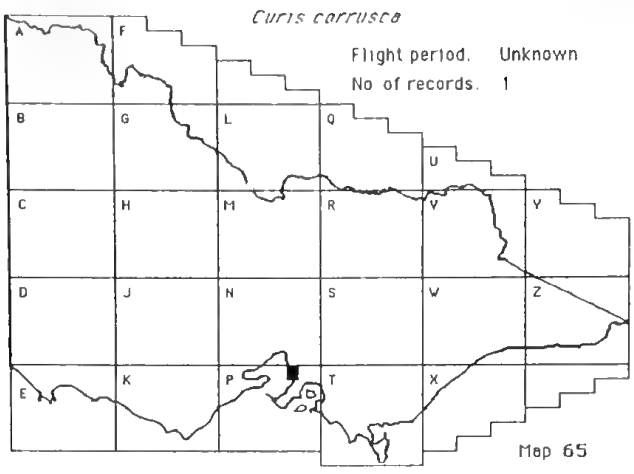
Map 63

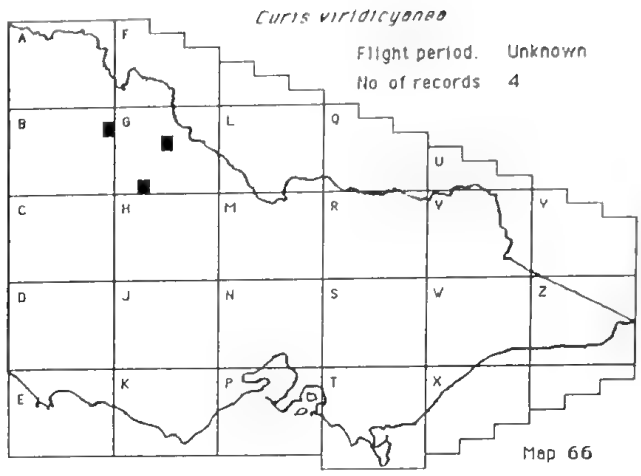
Curis caloptera

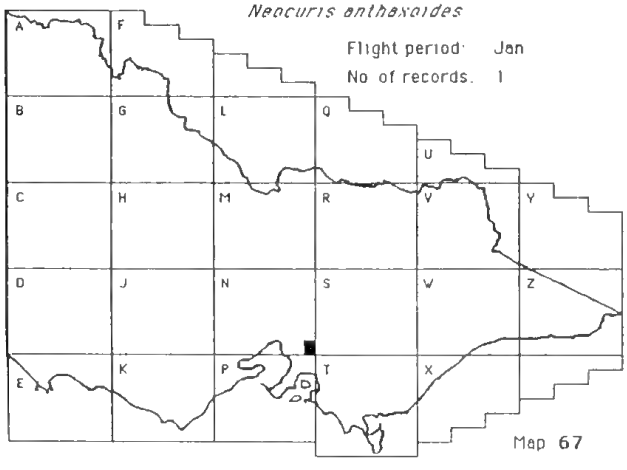
Flight period: Dec. to Feb
No. of records: 51

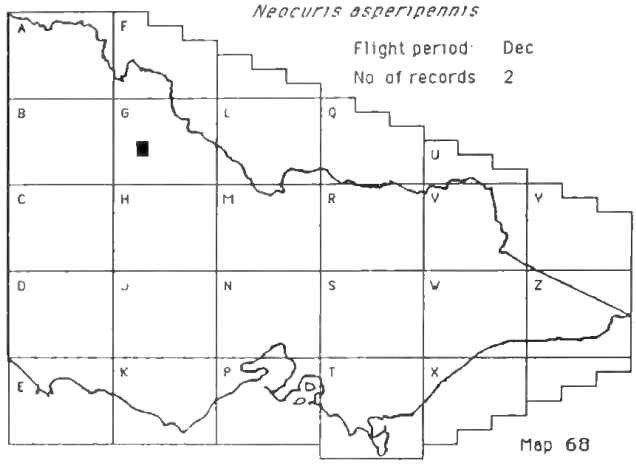


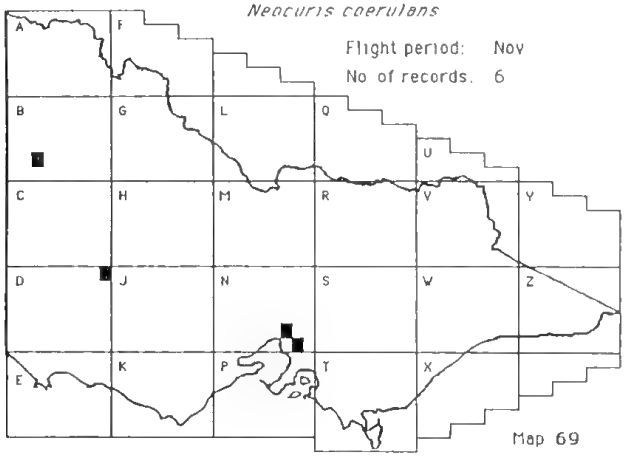
Map 64

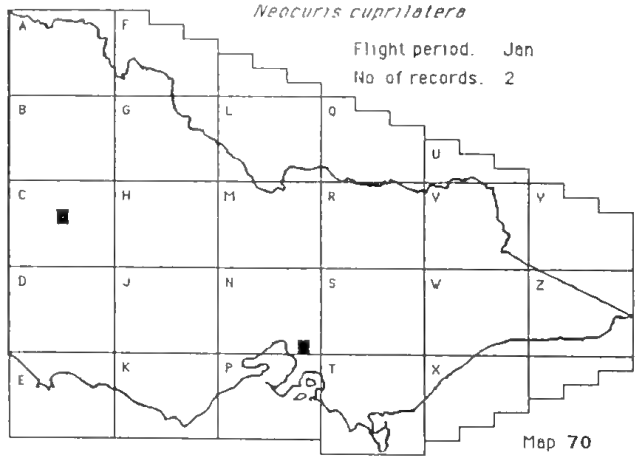

Curis corrusca
Flight period. Unknown
No of records. 1
Map 65

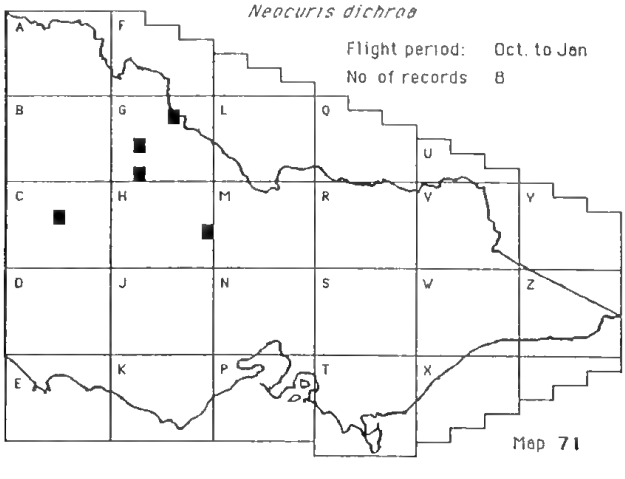

Curis viridicyanea
Flight period. Unknown
No of records 4
Map 66

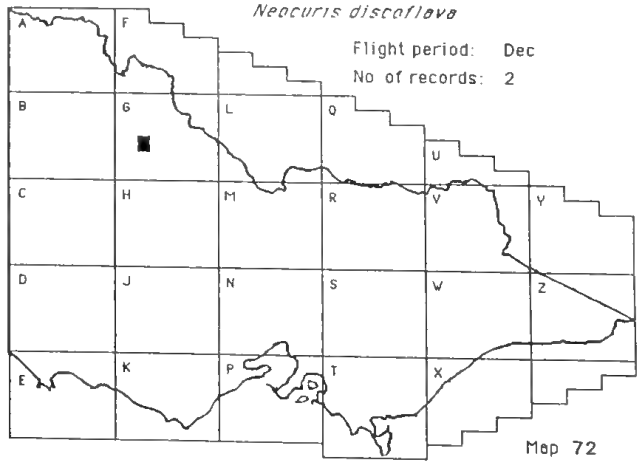

Neocuris anthaxoides
Flight period: Jan
No of records. 1
Map 67


Neocuris asperipennis
Flight period: Dec
No of records 2
Map 68


Neocuris coerulans
Flight period: Nov
No of records. 6
Map 69

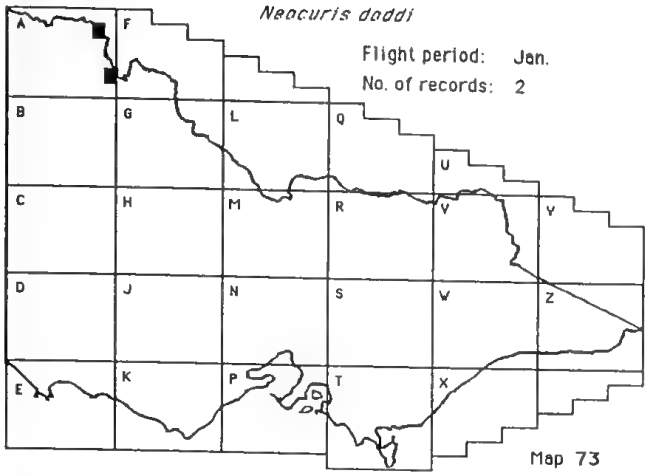

Neocuris cuprilatera
Flight period. Jan
No of records. 2
Map 70


Neocuris dichroa
Flight period: Oct. to Jan
No of records 8
Map 71


Neocuris discoflava
Flight period: Dec
No of records: 2
Map 72

Neocuris doddi

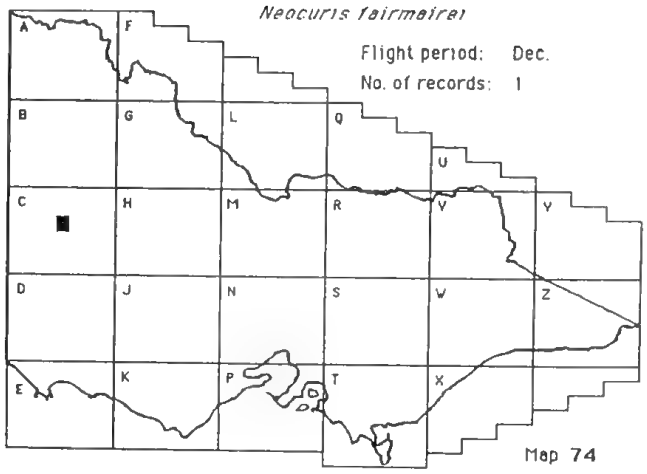
Flight period: Jan.
No. of records: 2



Map 73

Neocuris fairmairei

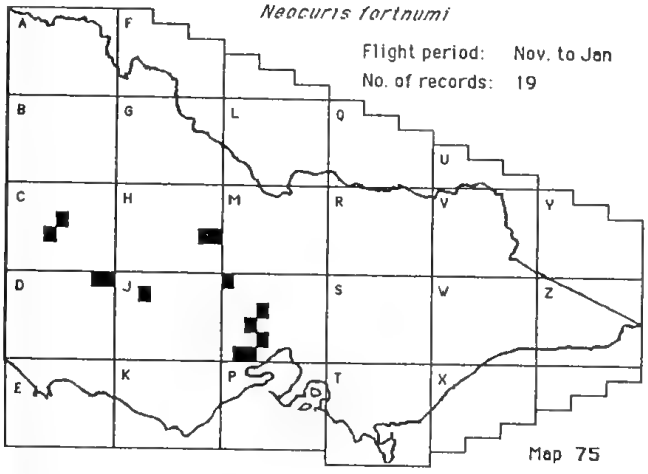
Flight period: Dec.
No. of records: 1



Map 74

Neocuris fortnumi

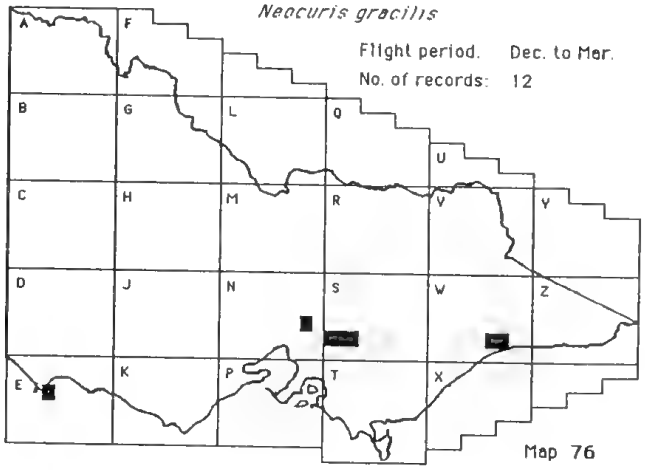
Flight period: Nov. to Jan
No. of records: 19



Map 75

Neocuris gracilis

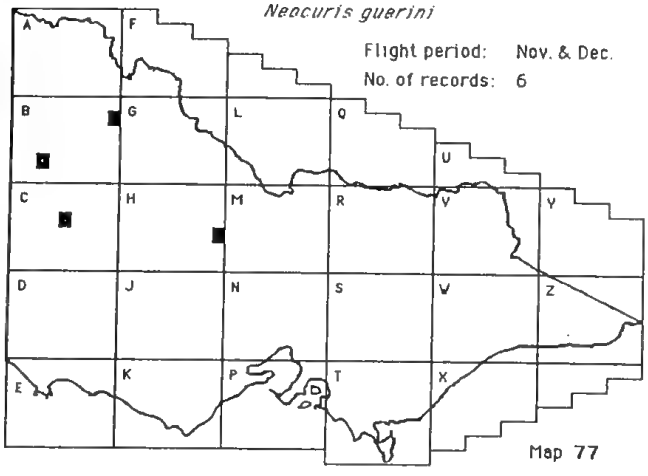
Flight period. Dec. to Mar.
No. of records: 12



Map 76

Neocuris guerini

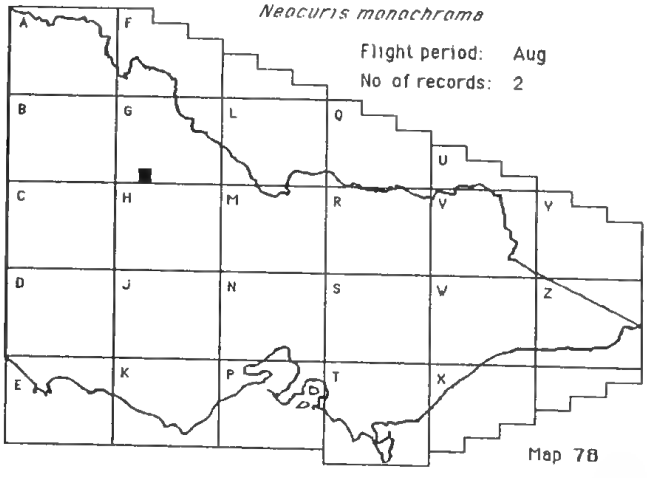
Flight period: Nov. & Dec.
No. of records: 6



Map 77

Neocuris monochroma

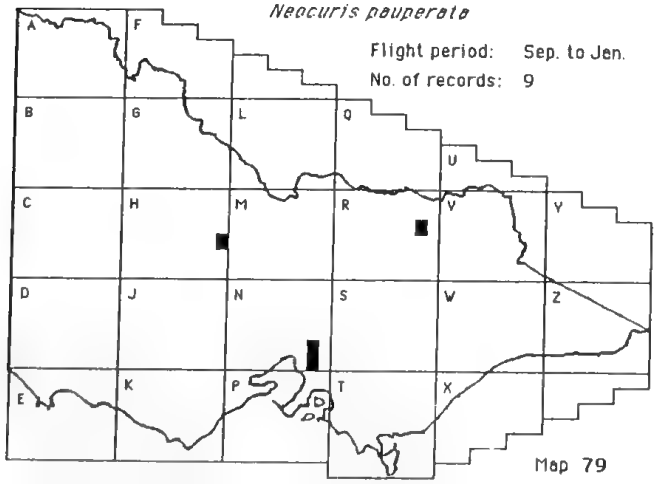
Flight period: Aug
No of records: 2



Map 78

Neocuris pauperata

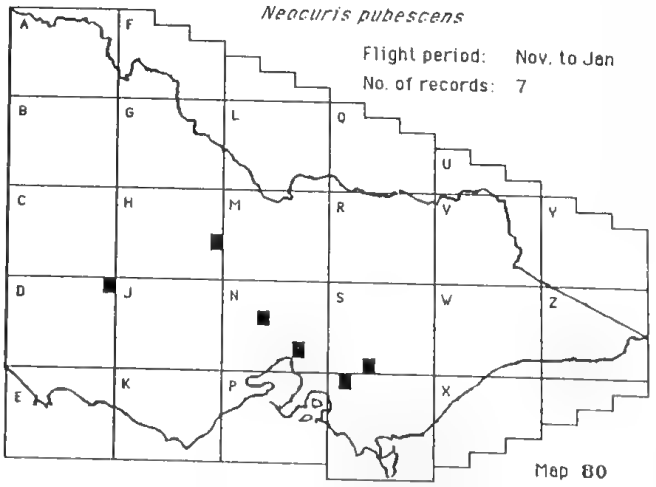
Flight period: Sep. to Jen.
No. of records: 9



Map 79

Neocuris pubescens

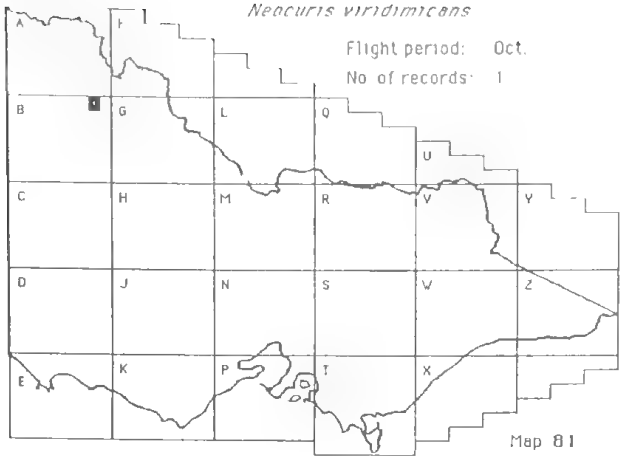
Flight period: Nov. to Jan
No. of records: 7



Map 80

Neacuris viridimicans

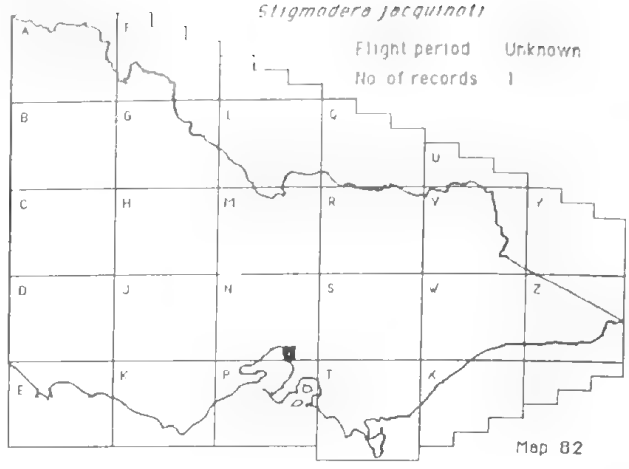
Flight period: Oct.
No of records: 1



Map 81

Stigmodera jacquinoti

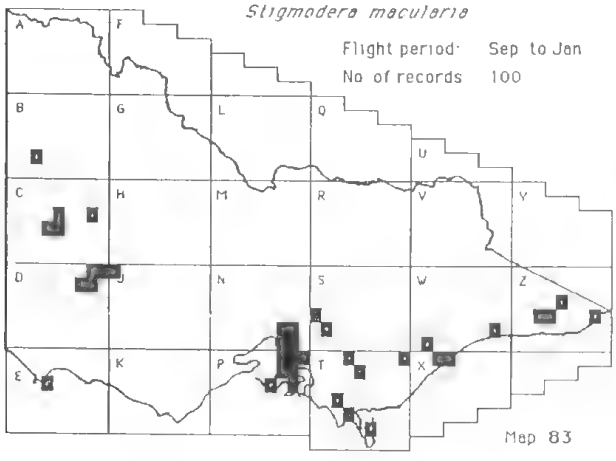
Flight period Unknown
No of records 1



Map 82

Stigmodera maculatia

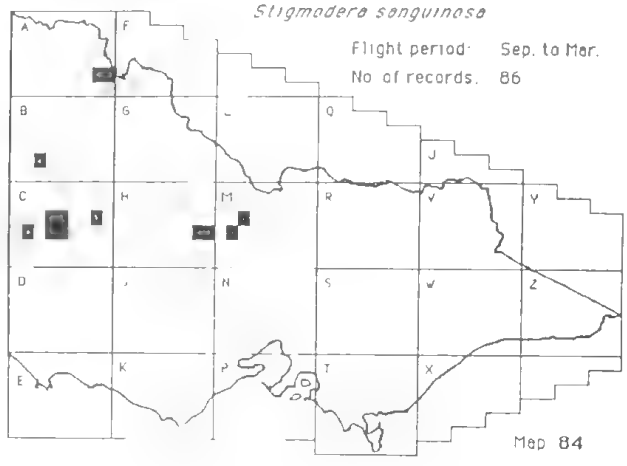
Flight period: Sep to Jan
No of records 100



Map 83

Stigmodera sanguinosa

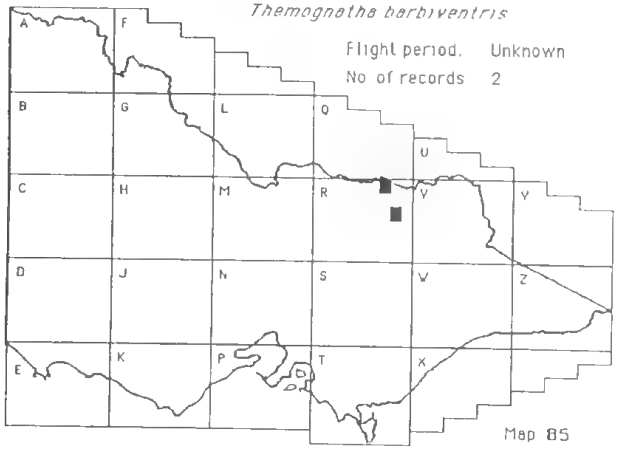
Flight period: Sep. to Mar.
No of records. 86



Map 84

Themognatha barbiventris

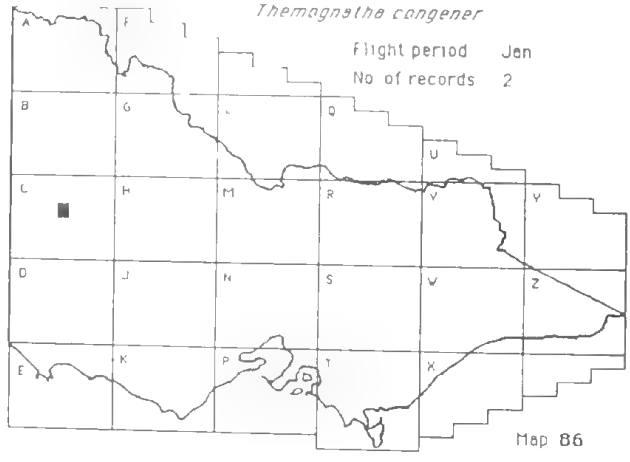
Flight period. Unknown
No of records 2



Map 85

Themognatha congener

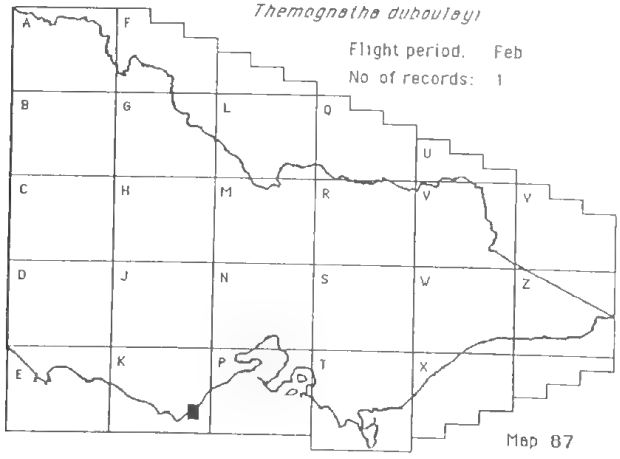
Flight period Jan
No of records 2



Map 86

Themognatha duboulayi

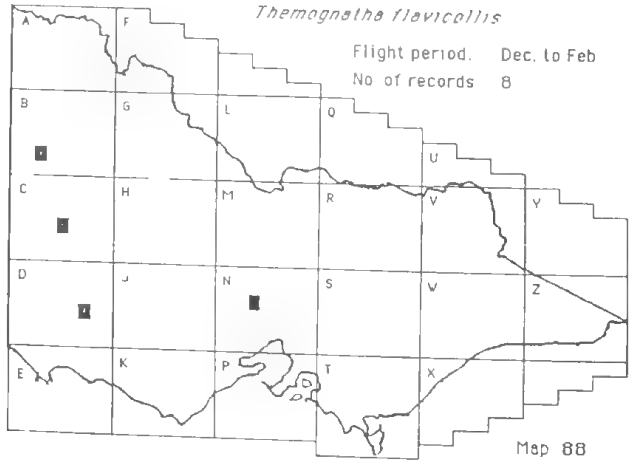
Flight period. Feb
No of records: 1



Map 87

Themognatha flavicollis

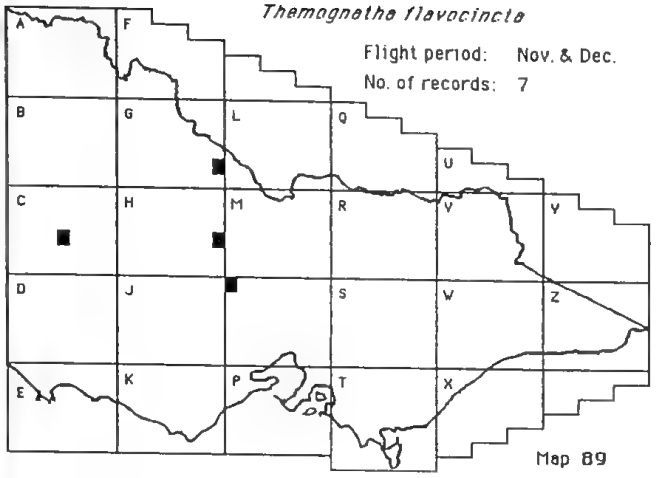
Flight period. Dec. to Feb
No of records 8



Map 88

Themognatha flavocincta

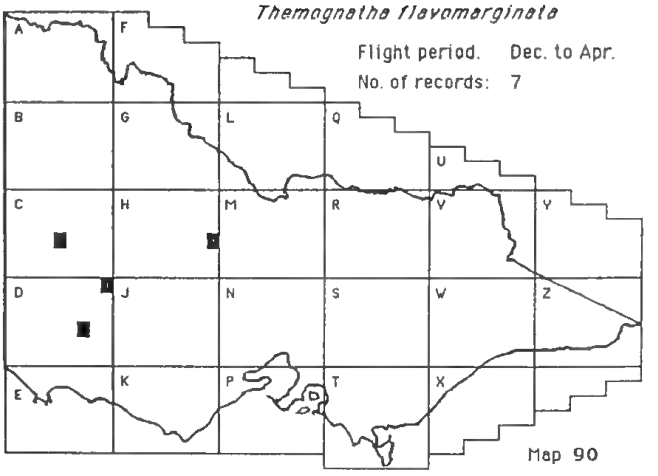
Flight period: Nov. & Dec.
No. of records: 7



Map 89

Themognatha flavomarginata

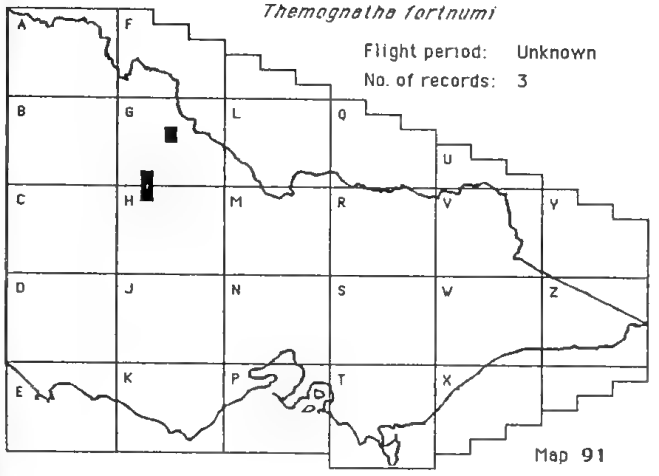
Flight period. Dec. to Apr.
No. of records: 7



Map 90

Themognatha fortnumi

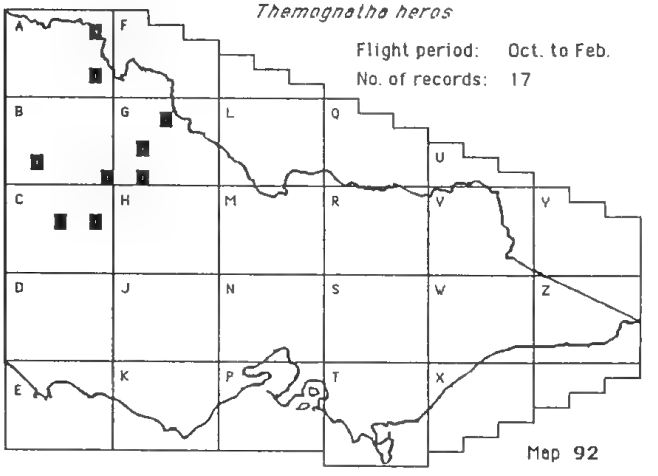
Flight period: Unknown
No. of records: 3



Map 91

Themognatha heros

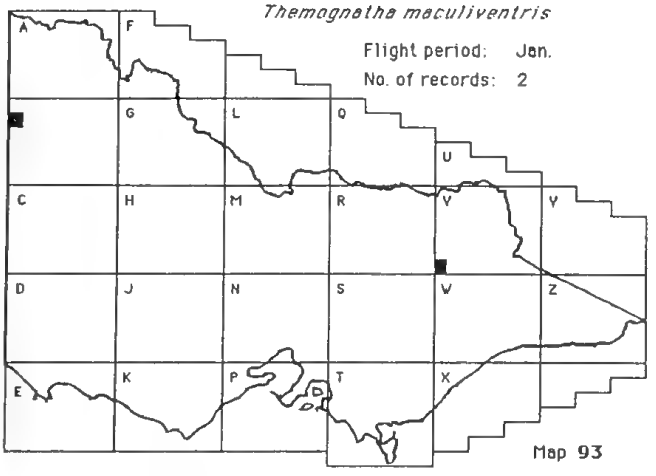
Flight period: Oct. to Feb.
No. of records: 17



Map 92

Themognatha maculiventris

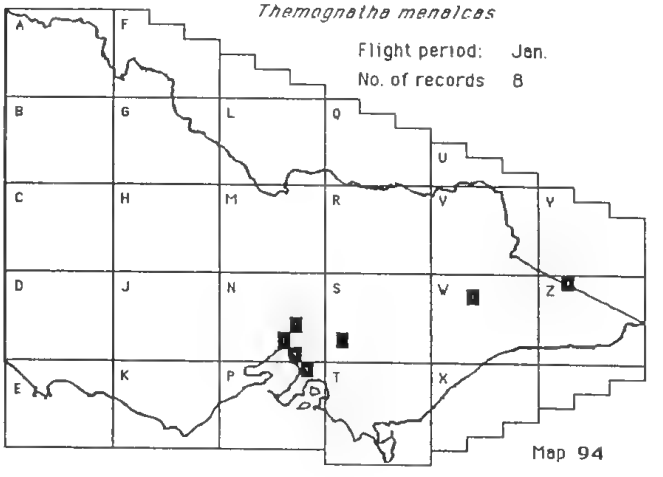
Flight period: Jan.
No. of records: 2



Map 93

Themognatha menalcas

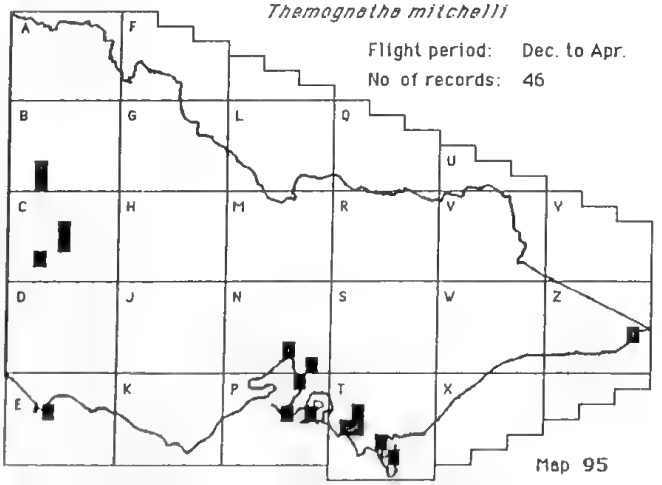
Flight period: Jan.
No. of records 8



Map 94

Themognatha mitchelli

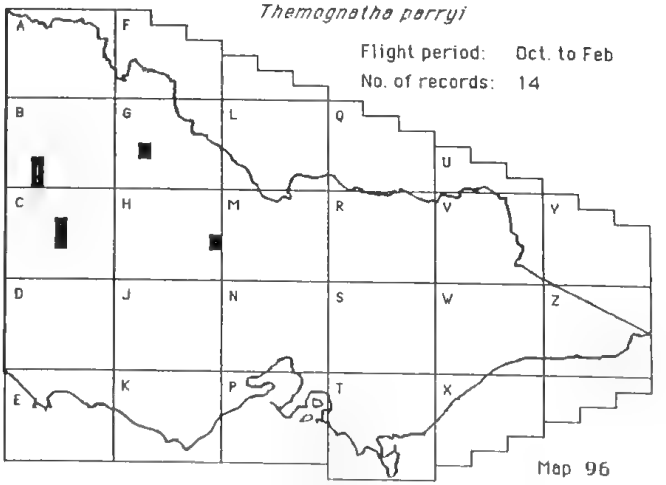
Flight period: Dec. to Apr.
No of records: 46



Map 95

Themognatha perryi

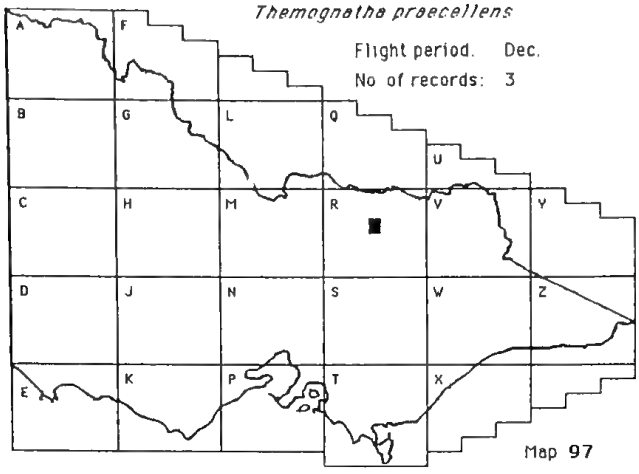
Flight period: Oct. to Feb
No. of records: 14



Map 96

Themognatha praecellens

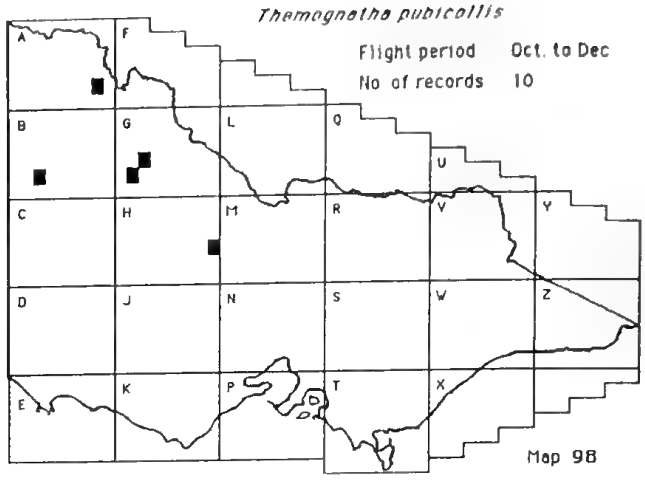
Flight period. Dec.
No of records: 3



Map 97

Themognatha pubicollis

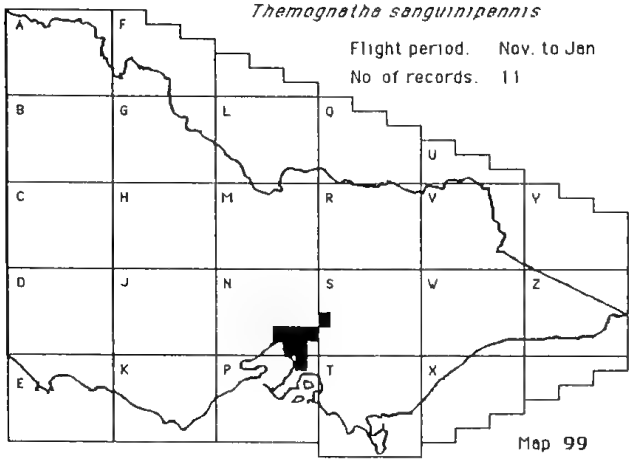
Flight period Oct. to Dec
No of records 10



Map 98

Themognatha sanguinipennis

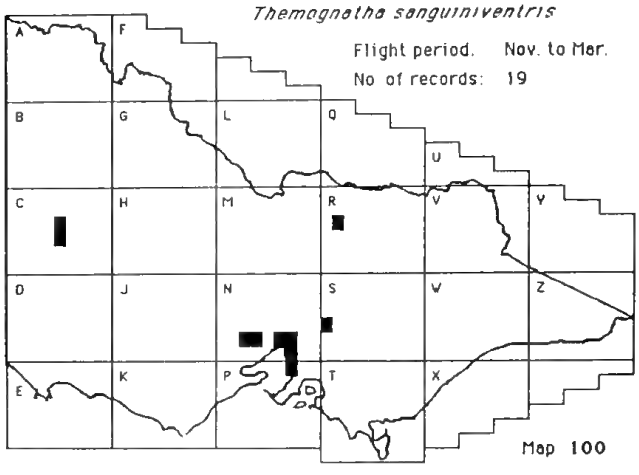
Flight period. Nov. to Jan
No of records. 11



Map 99

Themognatha sanguiniventris

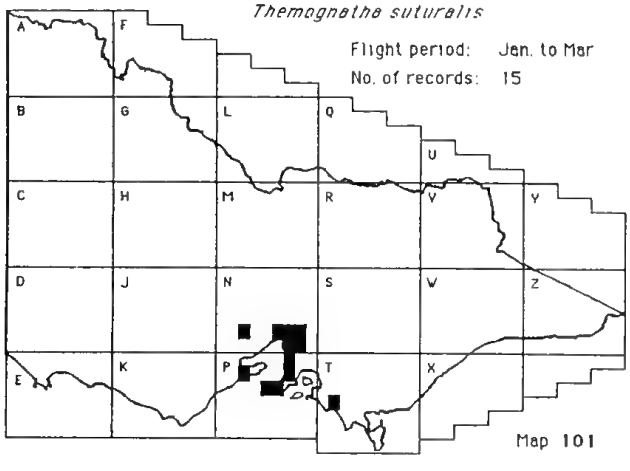
Flight period. Nov. to Mar.
No of records: 19



Map 100

Themognatha suturalis

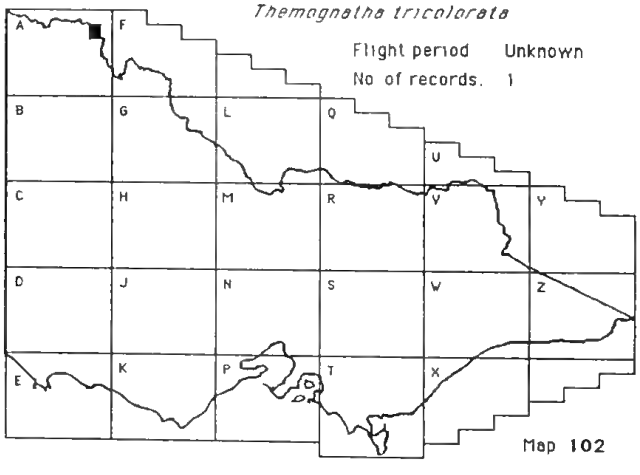
Flight period: Jan. to Mar
No. of records: 15



Map 101

Themognatha tricolorata

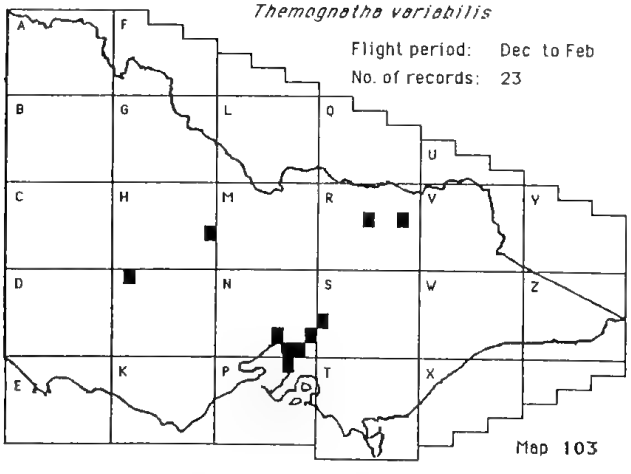
Flight period Unknown
No of records. 1



Map 102

Themognatha variabilis

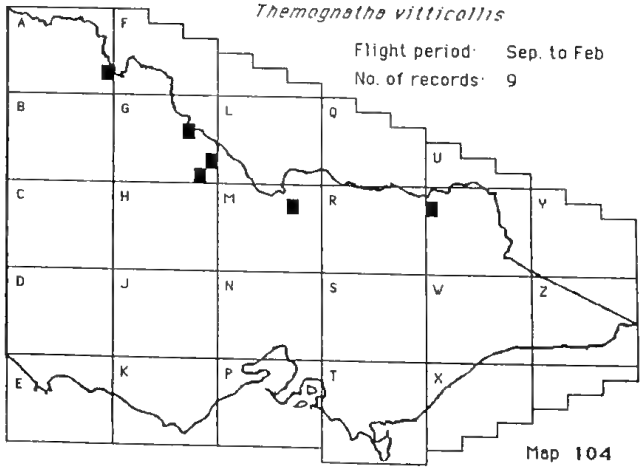
Flight period: Dec to Feb
No. of records: 23



Map 103

Themognatha vitticollis

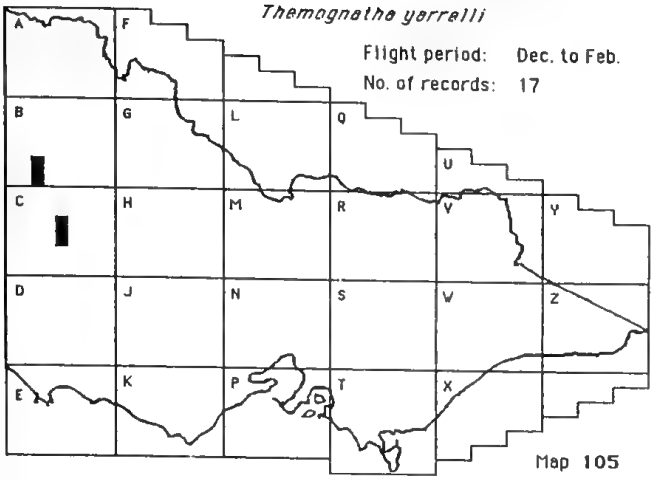
Flight period: Sep. to Feb
No. of records: 9



Map 104

Themognatha yarrelli

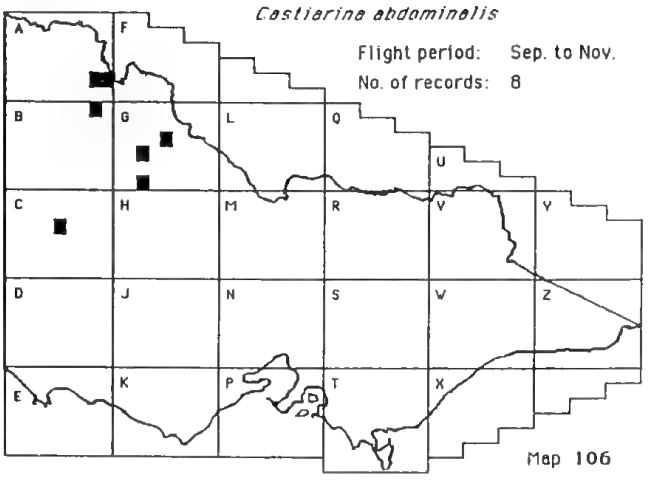
Flight period: Dec. to Feb.
No. of records: 17



Map 105

Castiarina abdominalis

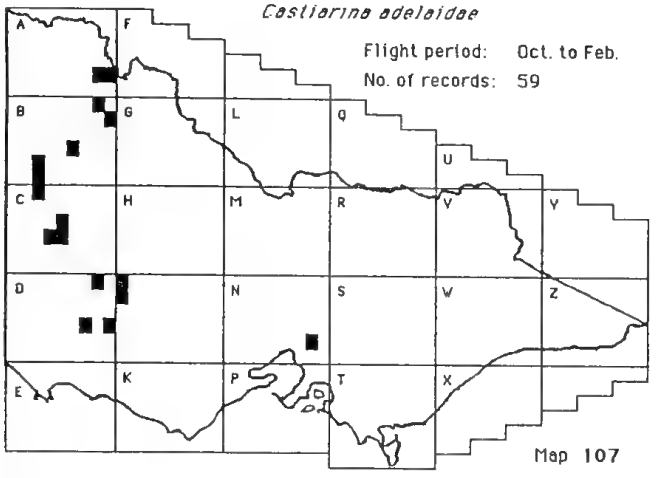
Flight period: Sep. to Nov.
No. of records: 8



Map 106

Castiarina adelaidae

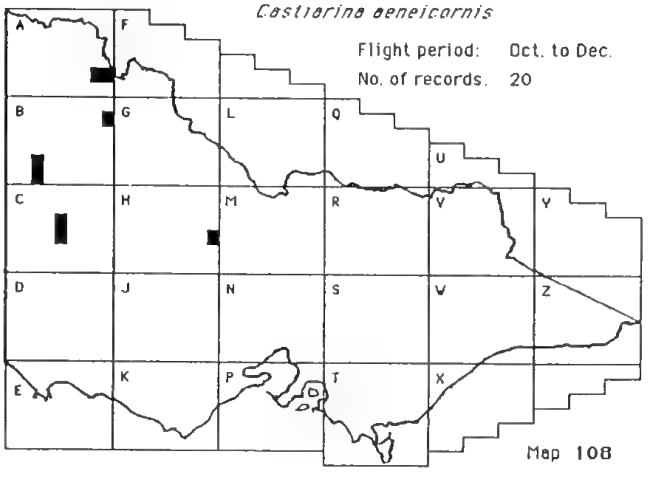
Flight period: Oct. to Feb.
No. of records: 59



Map 107

Castiarina aeneicornis

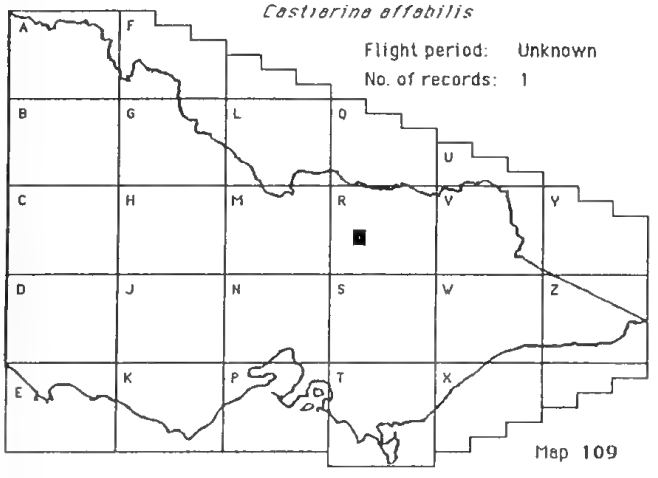
Flight period: Oct. to Dec.
No. of records. 20



Map 108

Castiarina affabilis

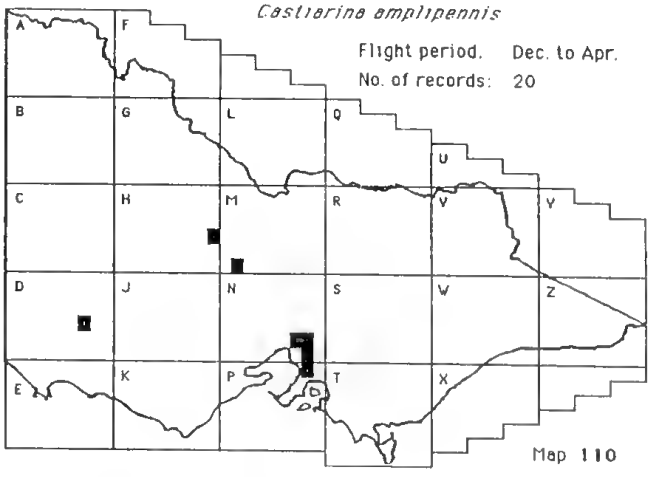
Flight period: Unknown
No. of records: 1



Map 109

Castiarina amplipennis

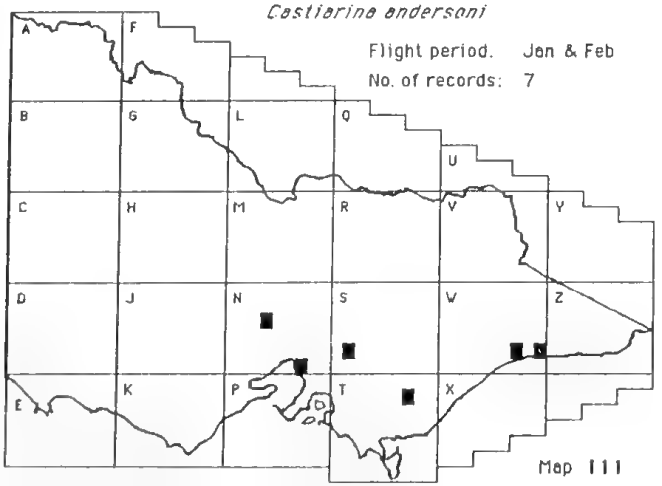
Flight period. Dec. to Apr.
No. of records: 20



Map 110

Castiarina andersoni

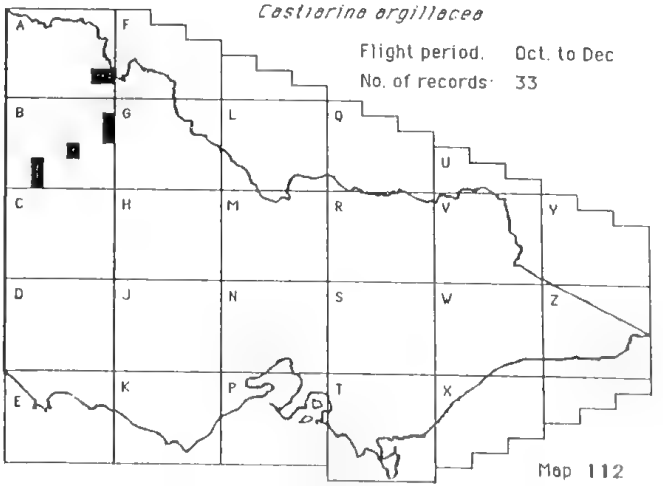
Flight period. Jan & Feb
No. of records: 7



Map 111

Castiarina argillacea

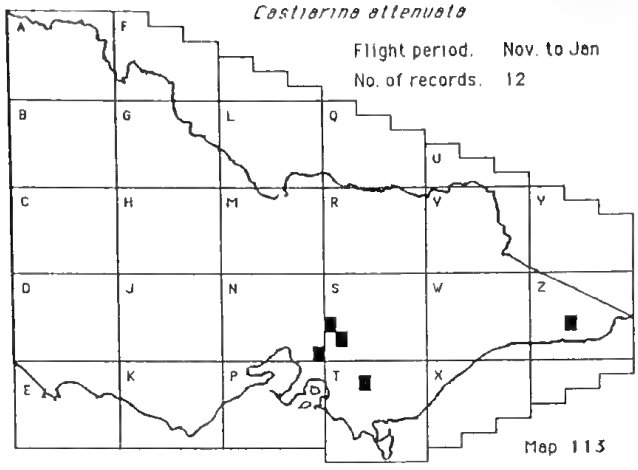
Flight period. Oct. to Dec
No. of records· 33



Map 112

Castiarina attenuata

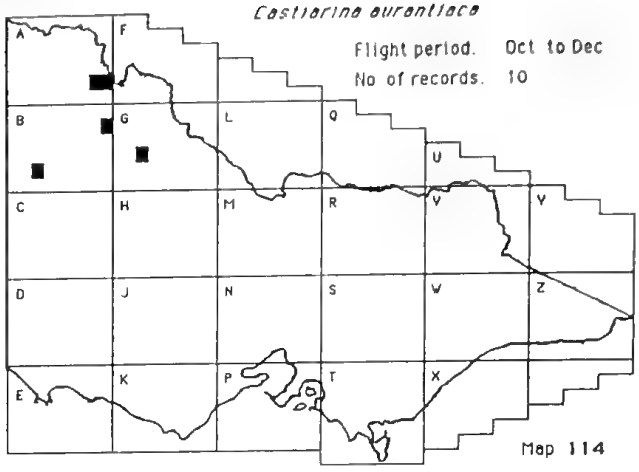
Flight period. Nov. to Jan
No. of records. 12



Map 113

Castiarina aurantiaca

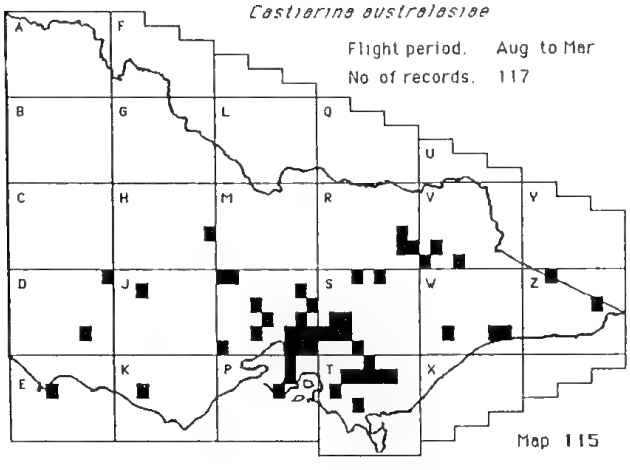
Flight period. Oct to Dec
No of records. 10



Map 114

Castiarina australasiae

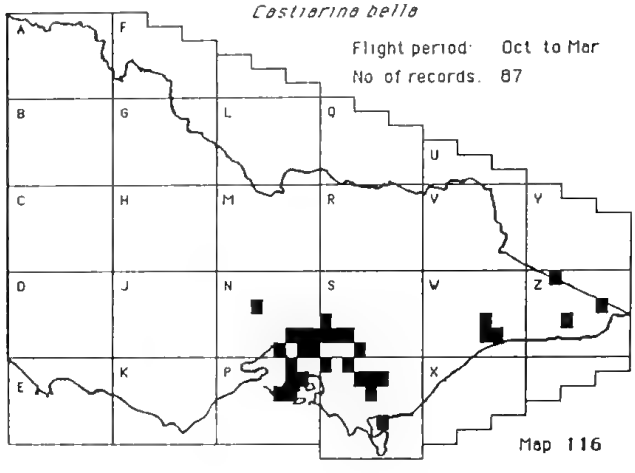
Flight period. Aug to Mar
No of records. 117



Map 115

Castiarina bella

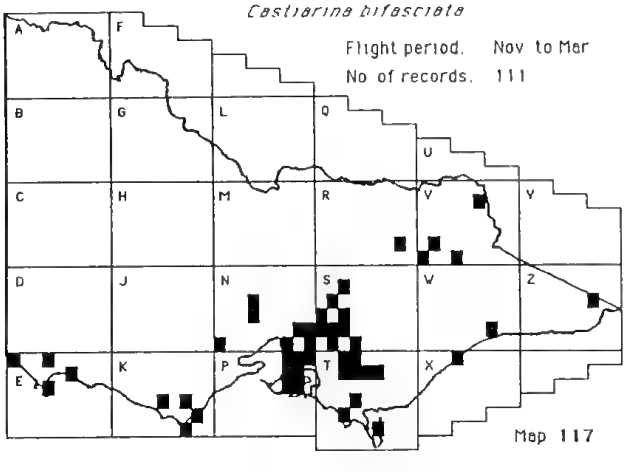
Flight period: Oct to Mar
No of records. 87



Map 116

Castiarina bifasciata

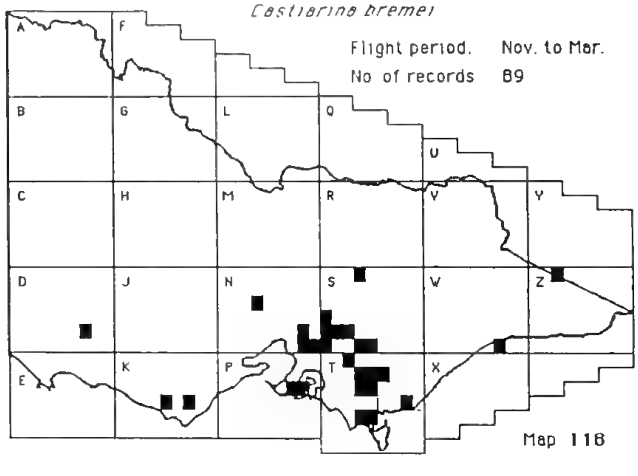
Flight period. Nov to Mar
No of records. 111



Map 117

Castiarina bremei

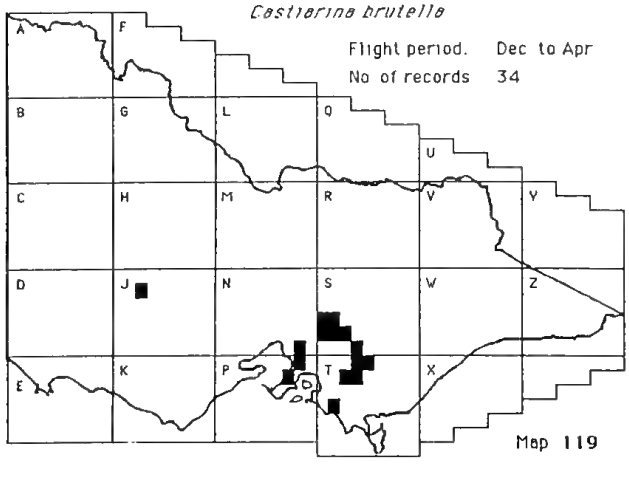
Flight period. Nov. to Mar.
No of records 89



Map 118

Castiarina brutella

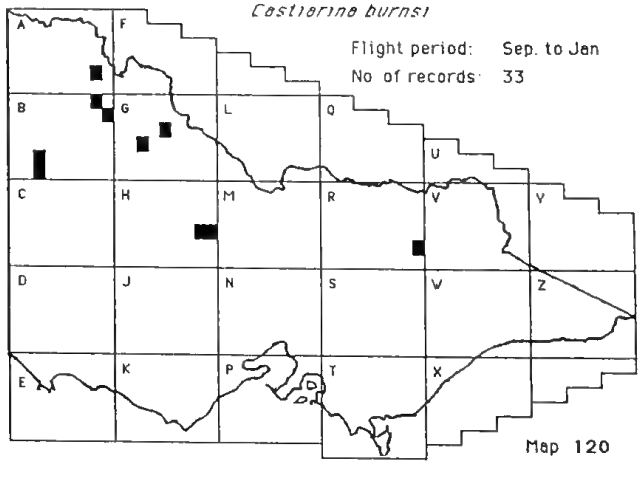
Flight period. Dec to Apr
No of records 34



Map 119

Castiarina burnsi

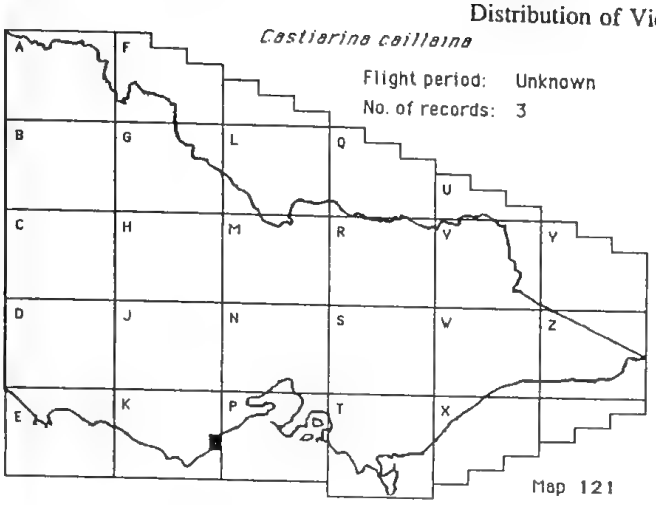
Flight period: Sep. to Jan
No of records 33



Map 120

Castiarina caillaina

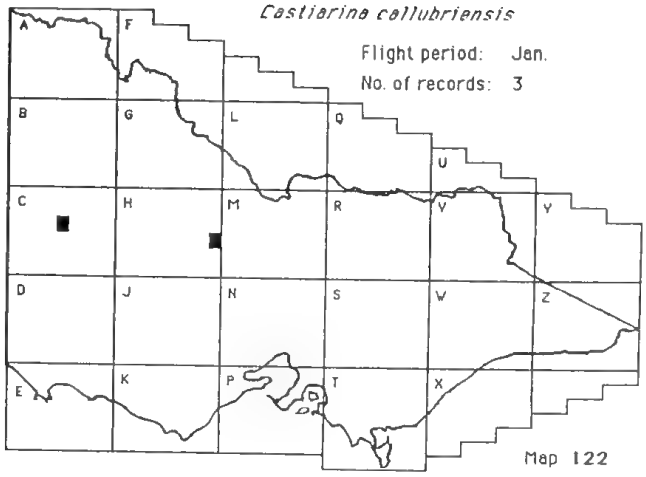
Flight period: Unknown
No. of records: 3



Map 121

Castiarina callubriensis

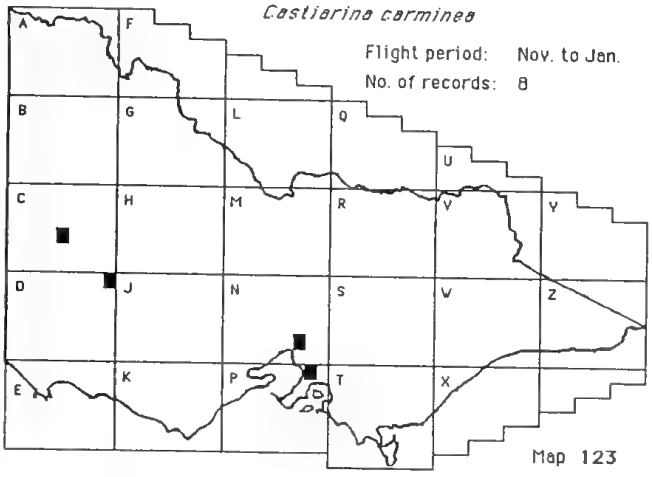
Flight period: Jan.
No. of records: 3



Map 122

Castiarina carminea

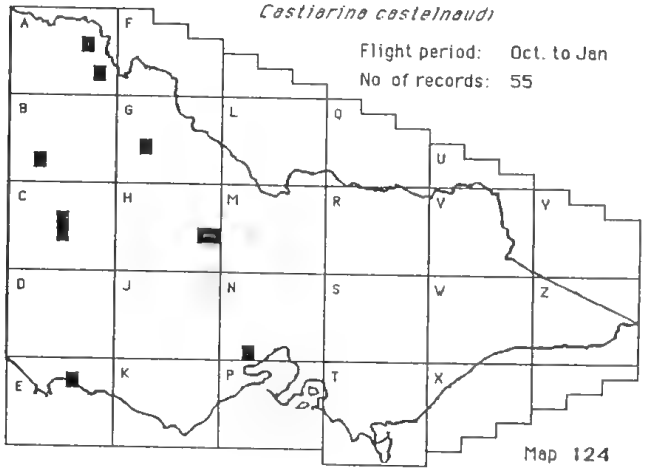
Flight period: Nov. to Jan.
No. of records: 8



Map 123

Castiarina castelnaudi

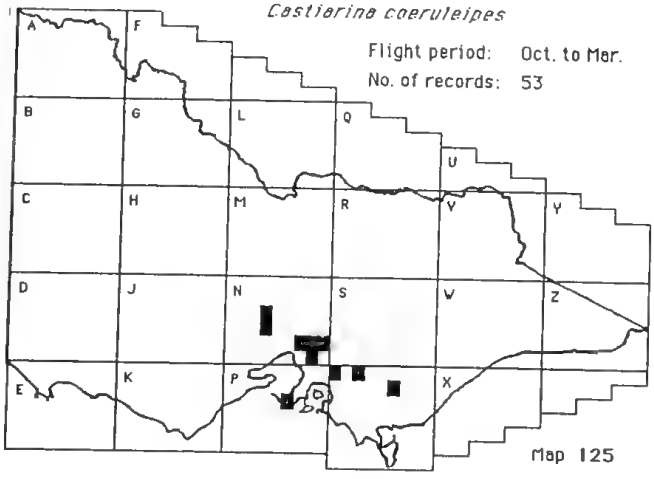
Flight period: Oct. to Jan
No. of records: 55



Map 124

Castiarina coeruleipes

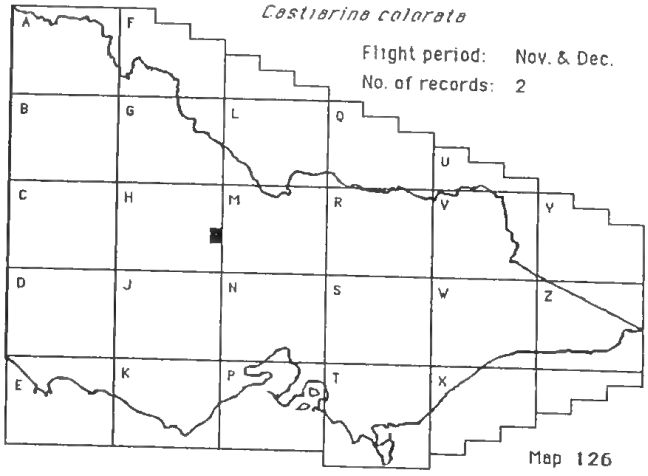
Flight period: Oct. to Mar.
No. of records: 53



Map 125

Castiarina colorata

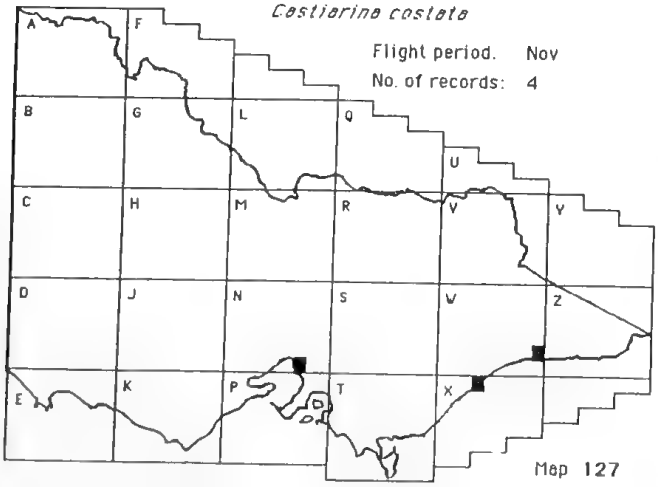
Flight period: Nov. & Dec.
No. of records: 2



Map 126

Castiarina costata

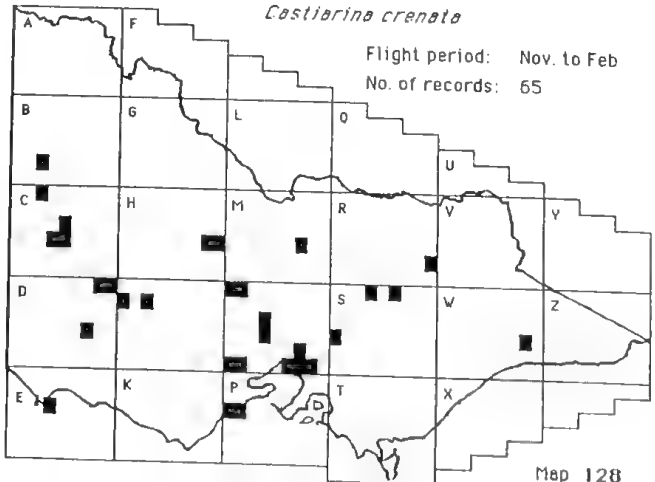
Flight period. Nov
No. of records: 4



Map 127

Castiarina crenata

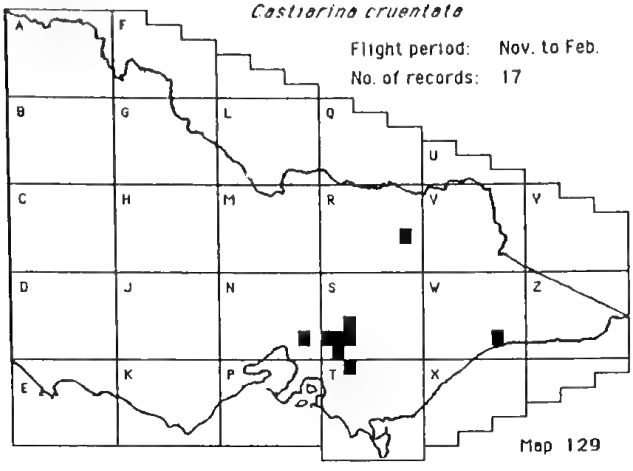
Flight period: Nov. to Feb
No. of records: 65



Map 128

Castiarina cruentata

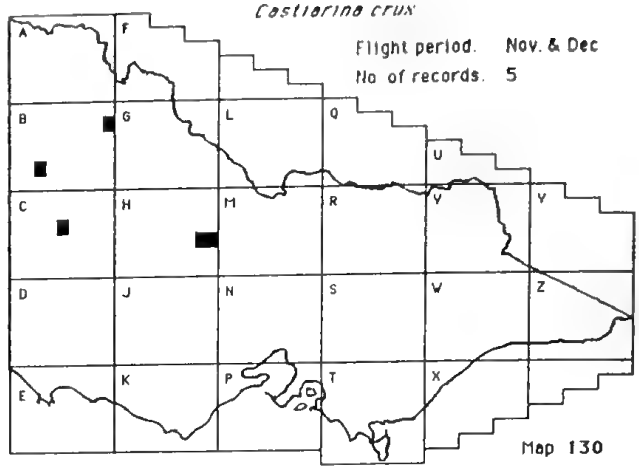
Flight period: Nov. to Feb.
No. of records: 17



Map 129

Castiarina crux

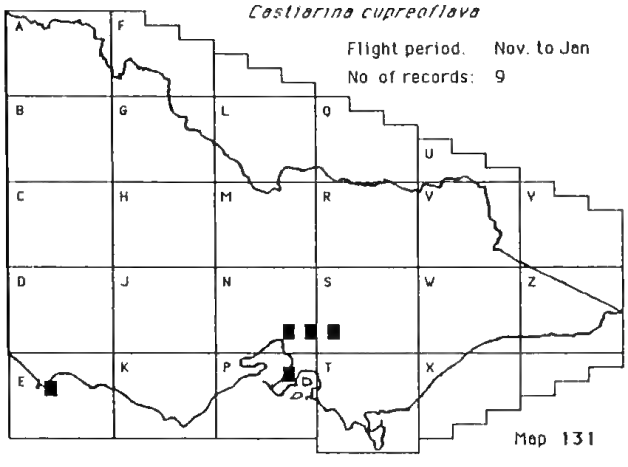
Flight period. Nov. & Dec
No of records. 5



Map 130

Castiarina cupreoflava

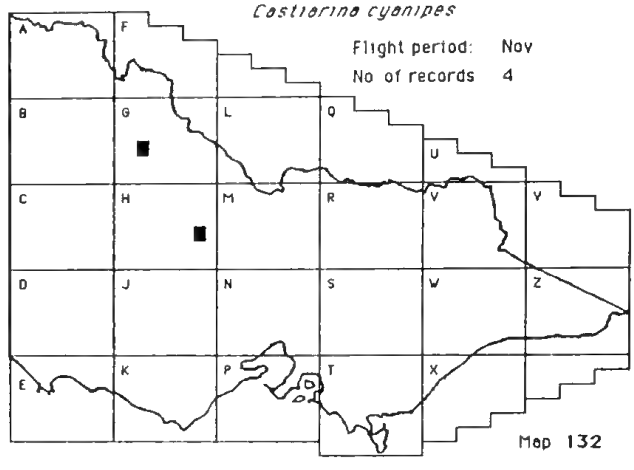
Flight period. Nov. to Jan
No of records: 9



Map 131

Castiarina cyanipes

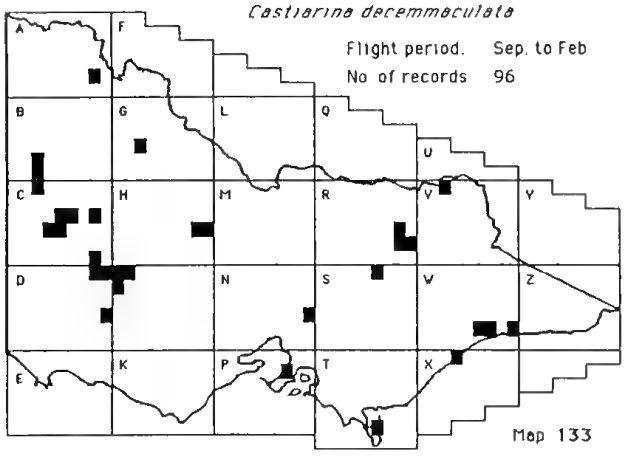
Flight period: Nov
No of records 4



Map 132

Castiarina decemmaculata

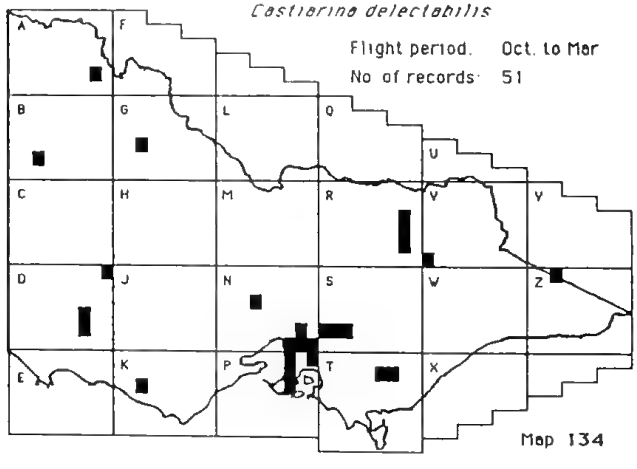
Flight period. Sep. to Feb
No of records 96



Map 133

Castiarina delectabilis

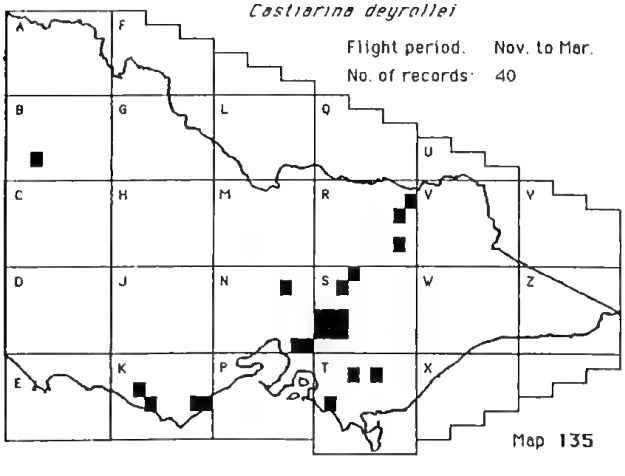
Flight period. Oct. to Mar
No of records 51



Map 134

Castiarina deyrollei

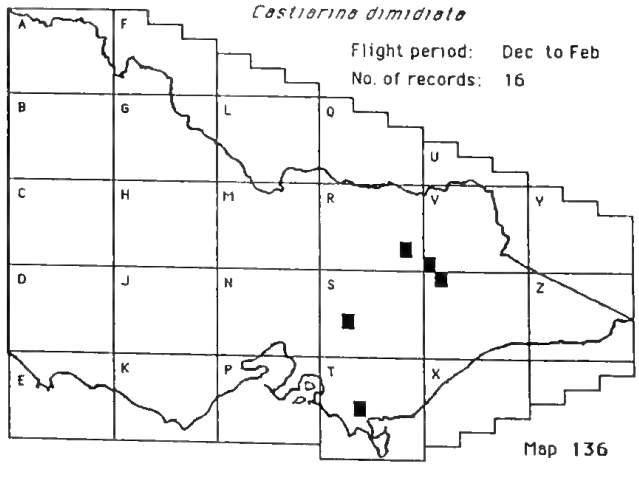
Flight period. Nov. to Mar.
No. of records 40



Map 135

Castiarina dimidiata

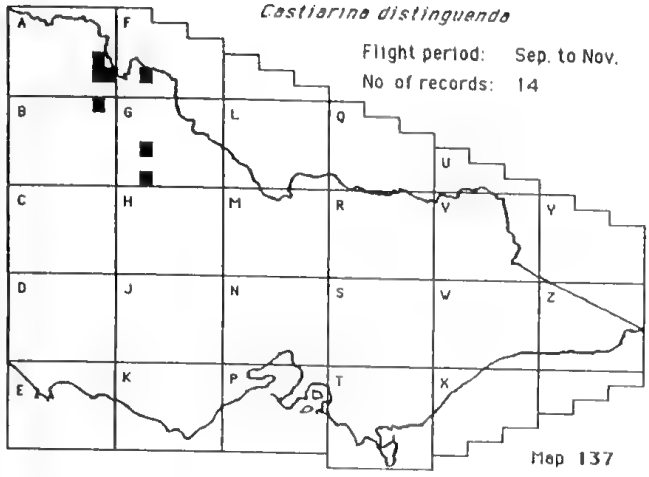
Flight period: Dec to Feb
No. of records: 16



Map 136

Castiarina distinguenda

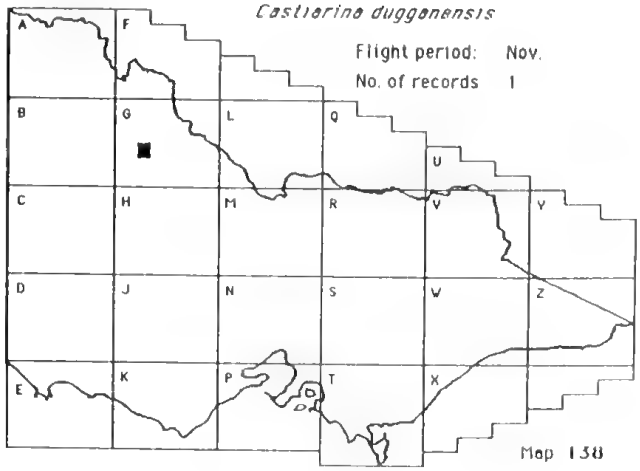
Flight period: Sep. to Nov.
No of records: 14



Map 137

Castiarina duggananensis

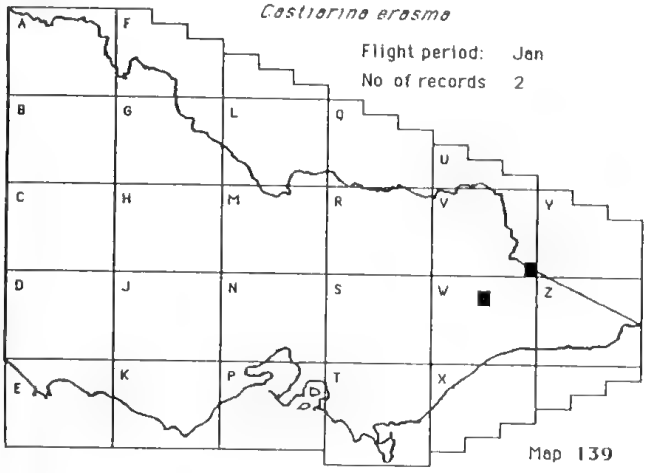
Flight period: Nov.
No. of records 1



Map 138

Castiarina erasma

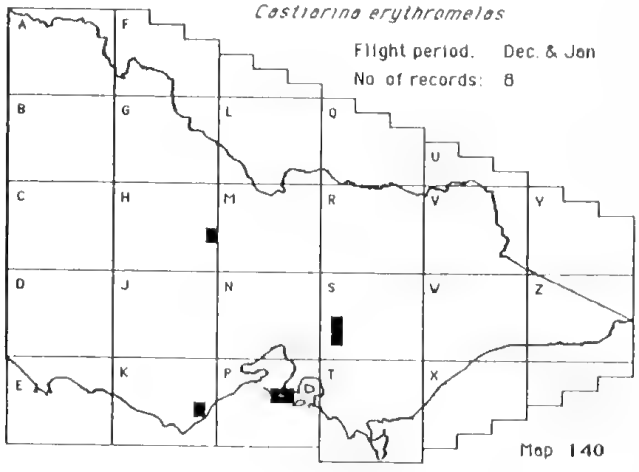
Flight period: Jan
No of records 2



Map 139

Castiarina erythromelas

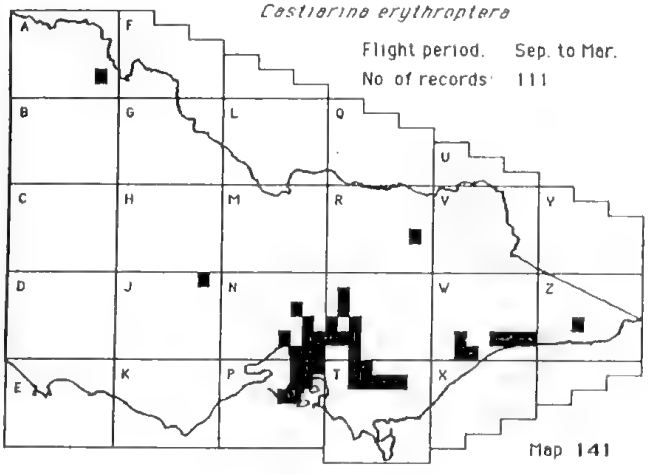
Flight period. Dec. & Jan
No of records: 8



Map 140

Castiarina erythroptera

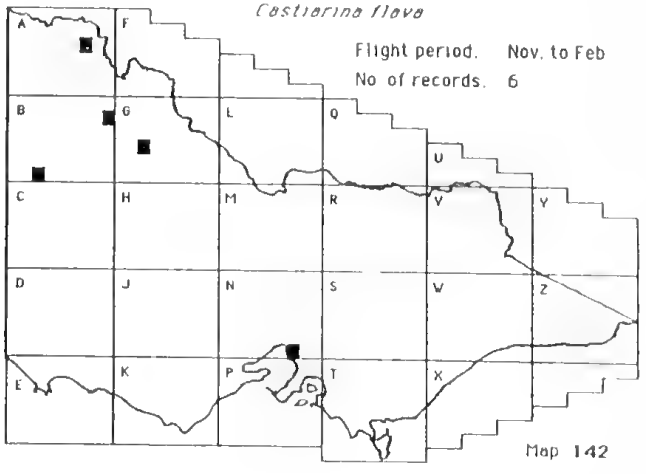
Flight period. Sep. to Mar.
No of records 111



Map 141

Castiarina flava

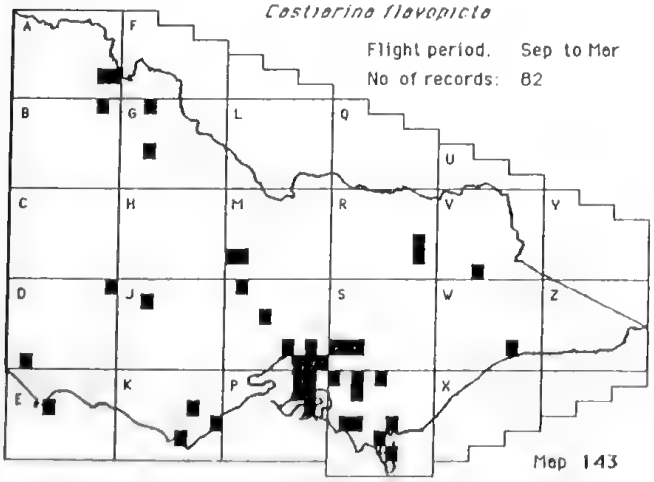
Flight period. Nov. to Feb
No of records. 6



Map 142

Castiarina flavopicta

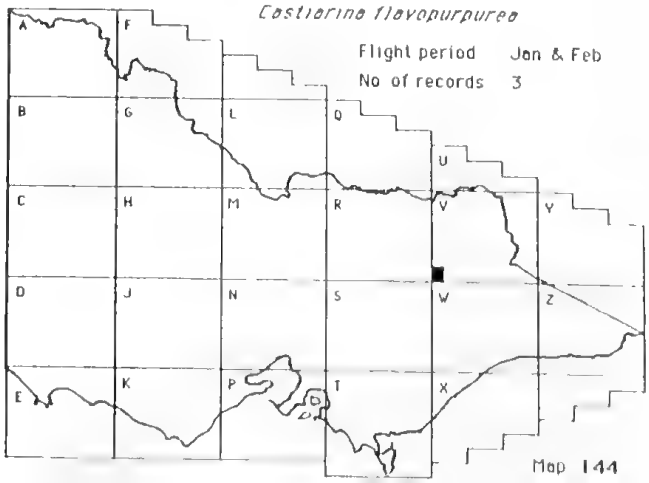
Flight period. Sep to Mar
No of records: 82



Map 143

Castiarina flavopurpurea

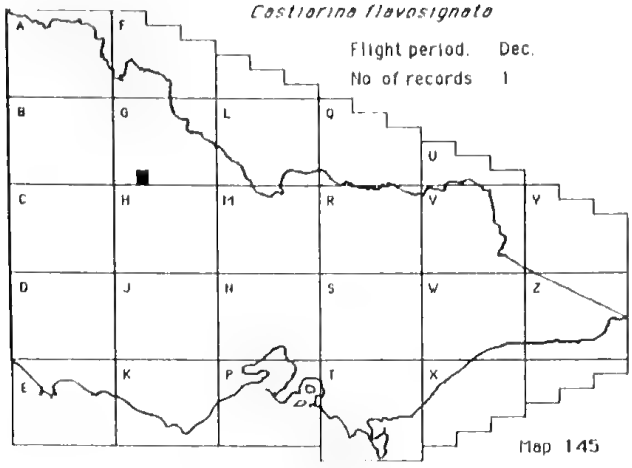
Flight period Jan & Feb
No of records 3



Map 144

Castiarina flavosignata

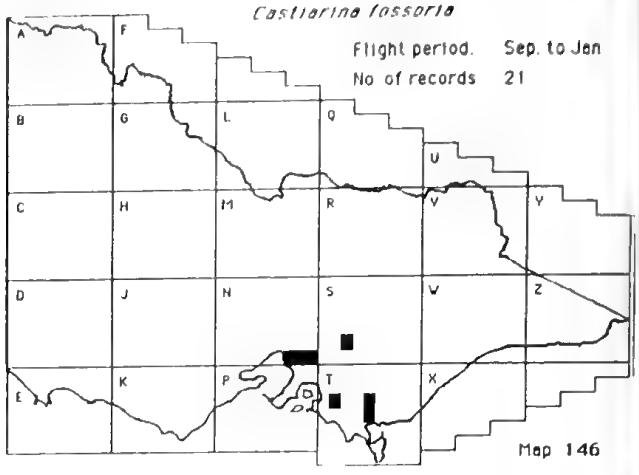
Flight period. Dec.
No of records 1



Map 145

Castiarina fossoria

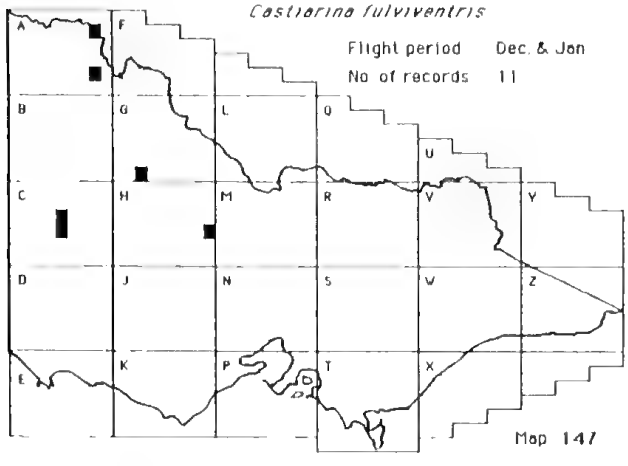
Flight period. Sep. to Jan
No of records 21



Map 146

Castiarina fulviventris

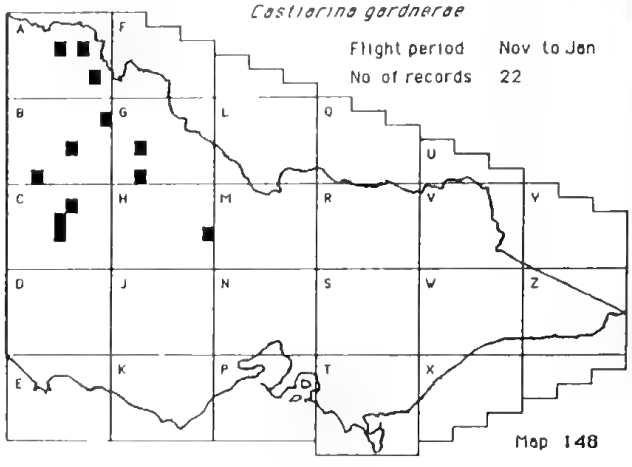
Flight period Dec. & Jan
No of records 11



Map 147

Castiarina gardnerae

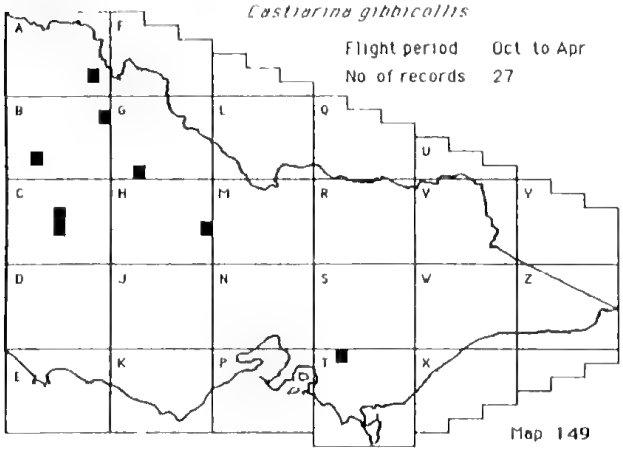
Flight period Nov. to Jan
No of records 22



Map 148

Castiarina gibbicollis

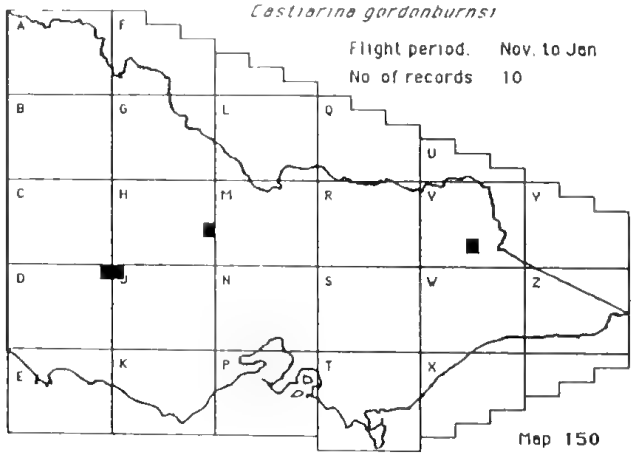
Flight period Oct. to Apr
No of records 27



Map 149

Castiarina gordonburnsi

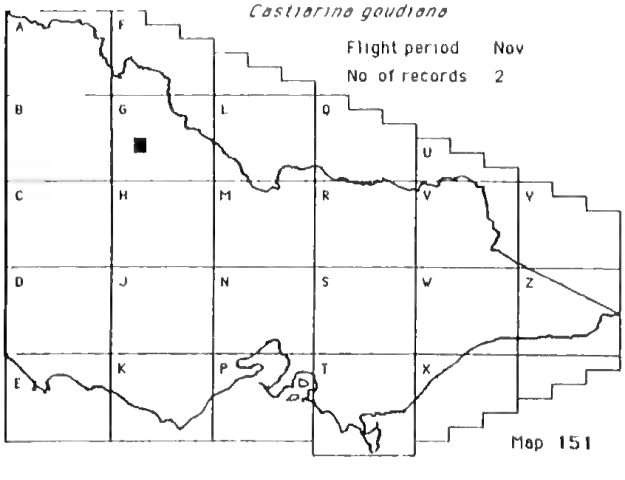
Flight period. Nov. to Jan
No of records 10



Map 150

Castiarina goudiana

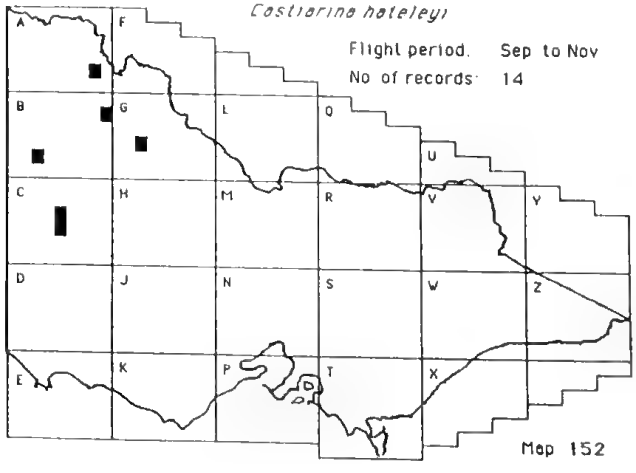
Flight period Nov
No of records 2



Map 151

Castiarina hateleyi

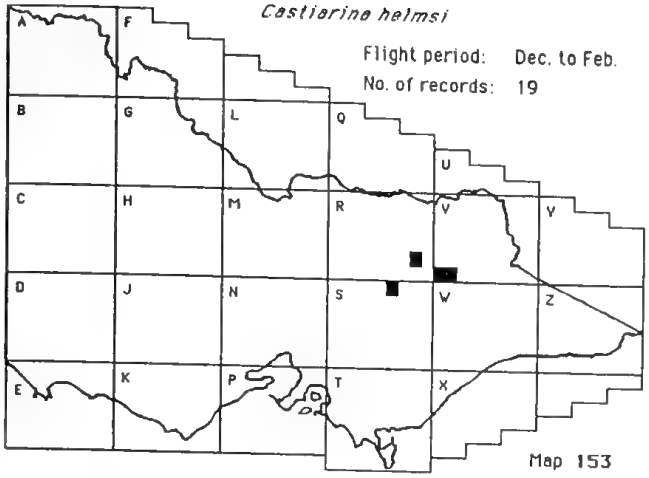
Flight period. Sep to Nov
No of records 14



Map 152

Castiarina helmsi

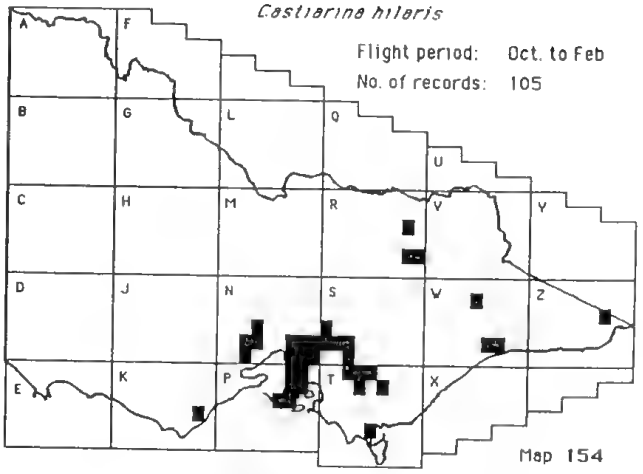
Flight period: Dec. to Feb.
No. of records: 19



Map 153

Castiarina hilaris

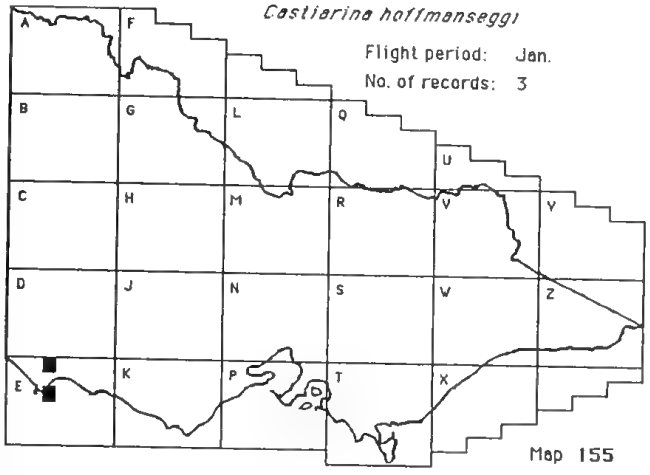
Flight period: Oct. to Feb
No. of records: 105



Map 154

Castiarina hoffmanseggi

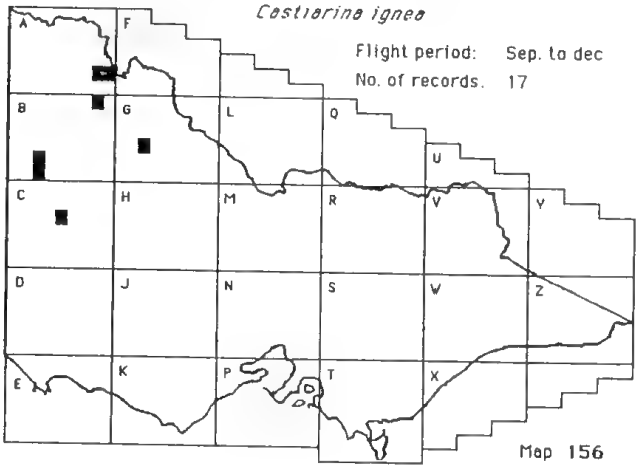
Flight period: Jan.
No. of records: 3



Map 155

Castiarina ignea

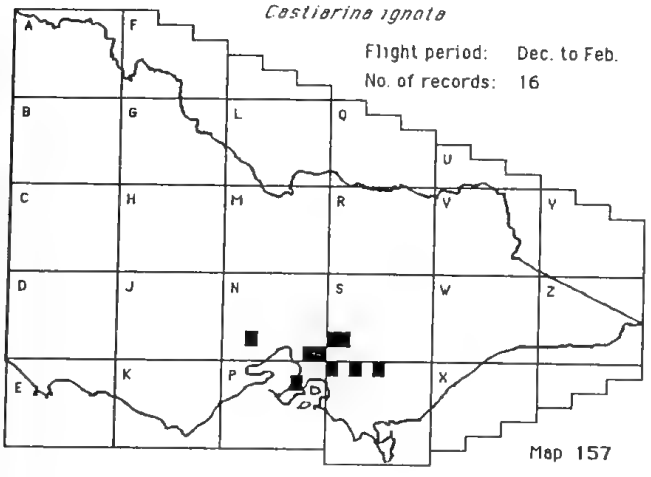
Flight period: Sep. to dec
No. of records. 17



Map 156

Castiarina ignota

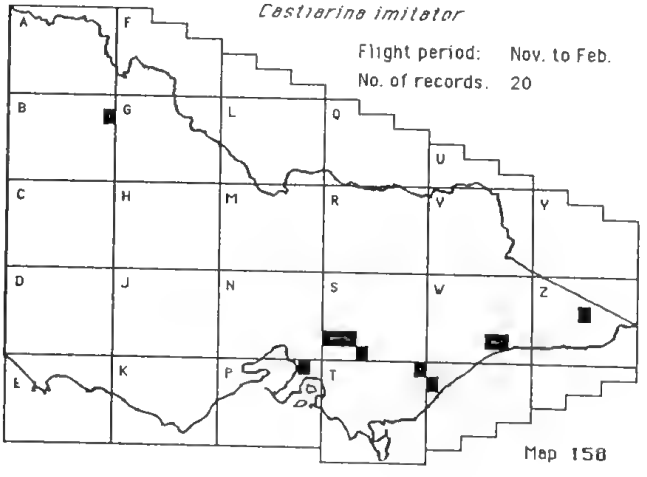
Flight period: Dec. to Feb.
No. of records: 16



Map 157

Castiarina imitator

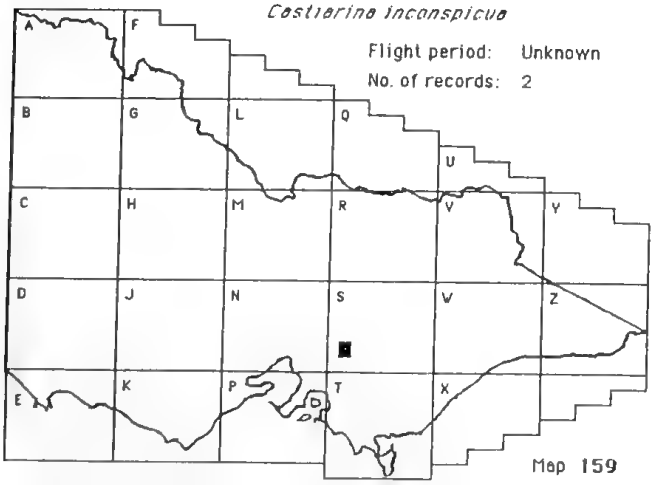
Flight period: Nov. to Feb.
No. of records. 20



Map 158

Castiarina inconspicua

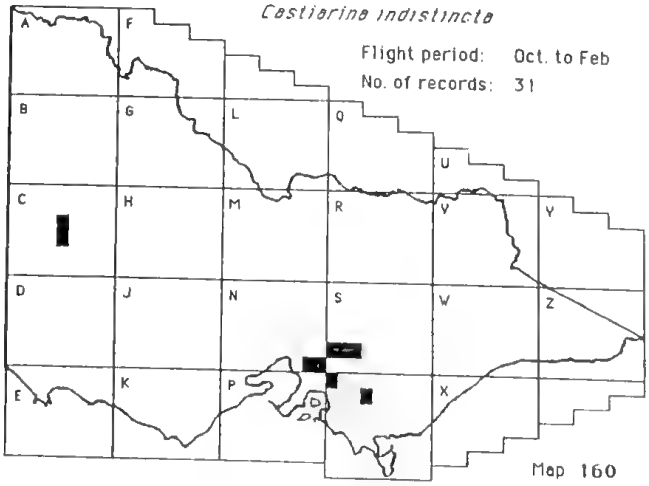
Flight period: Unknown
No. of records: 2



Map 159

Castiarina indistincta

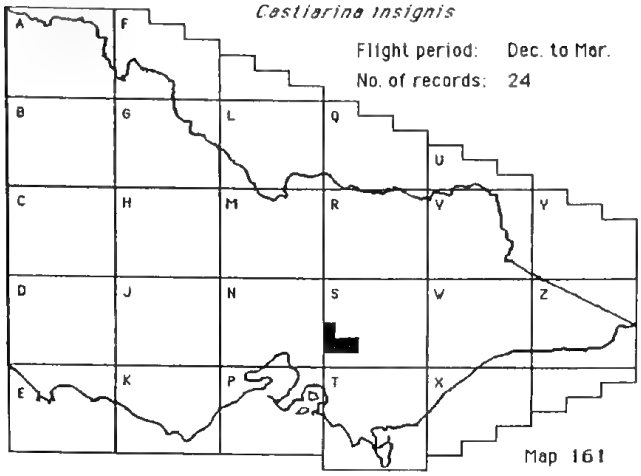
Flight period: Oct. to Feb
No. of records: 31



Map 160

Castiarina insignis

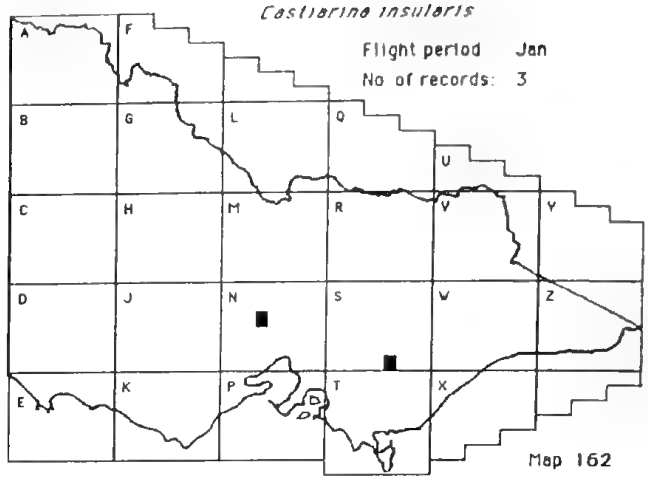
Flight period: Dec. to Mar.
No. of records: 24



Map 161

Castiarina insularis

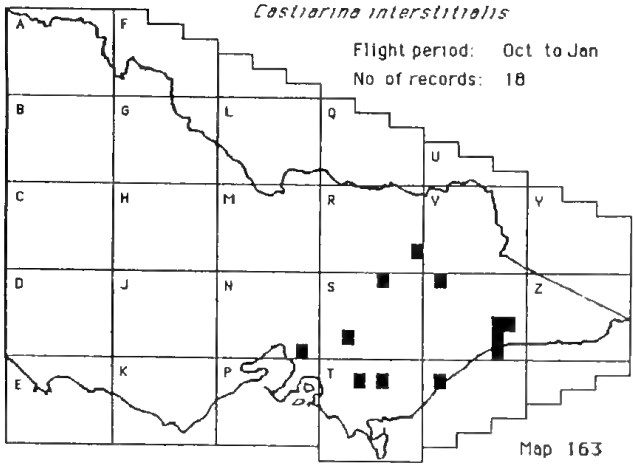
Flight period Jan
No of records: 3



Map 162

Castiarina interstitialis

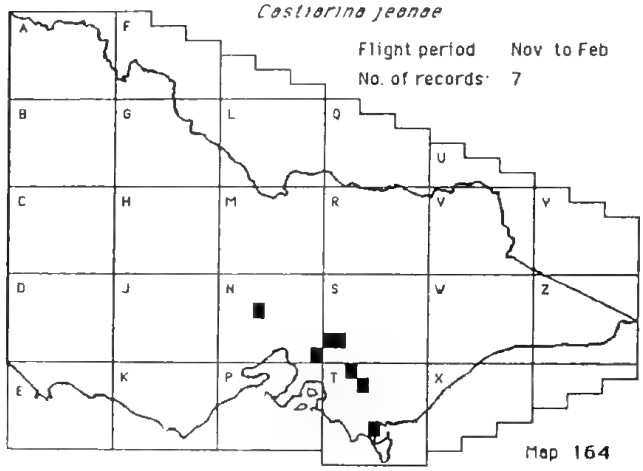
Flight period: Oct to Jan
No of records: 18



Map 163

Castiarina jeanae

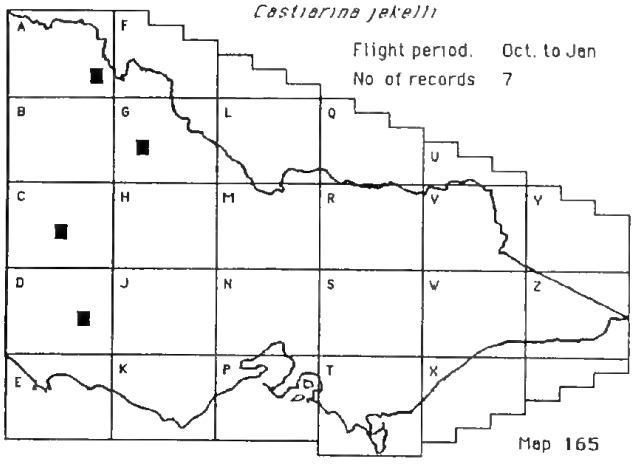
Flight period Nov to Feb
No. of records: 7



Map 164

Castiarina jekelii

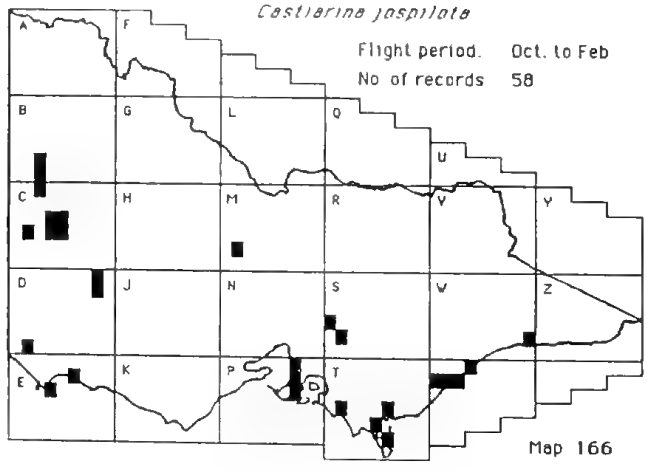
Flight period. Oct. to Jan
No of records 7



Map 165

Castiarina jaspilota

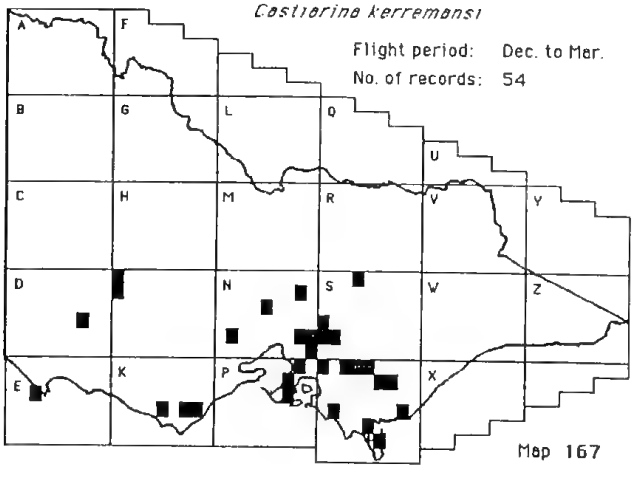
Flight period. Oct. to Feb
No of records 58



Map 166

Castiarina kerremansi

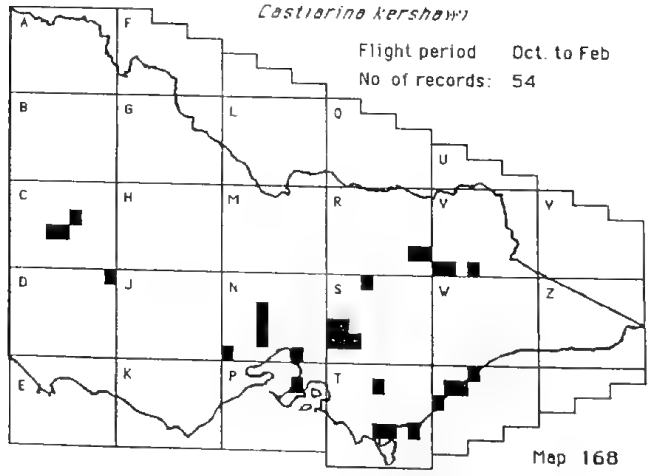
Flight period: Dec. to Mar.
No. of records: 54



Map 167

Castiarina kershawi

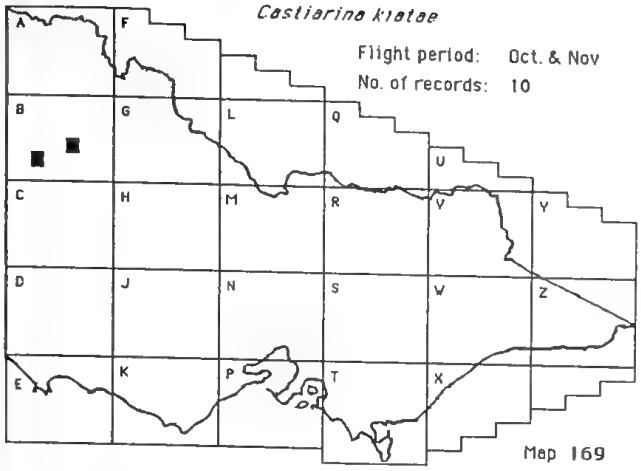
Flight period Oct. to Feb
No of records: 54



Map 168

Castiarina kiatae

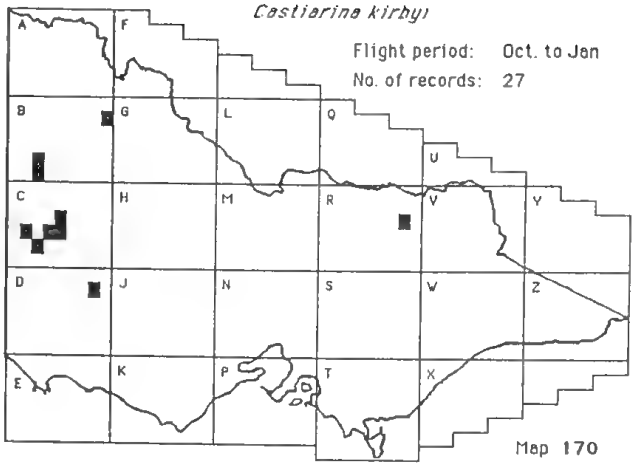
Flight period: Oct. & Nov
No. of records: 10



Map 169

Castiarina kirbyi

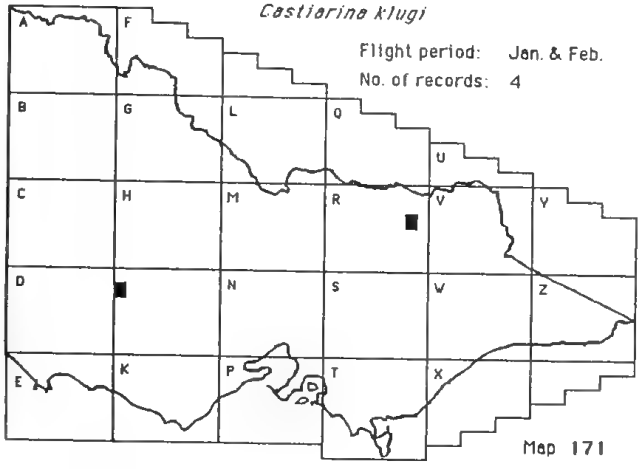
Flight period: Oct. to Jan
No. of records: 27



Map 170

Castiarina klugi

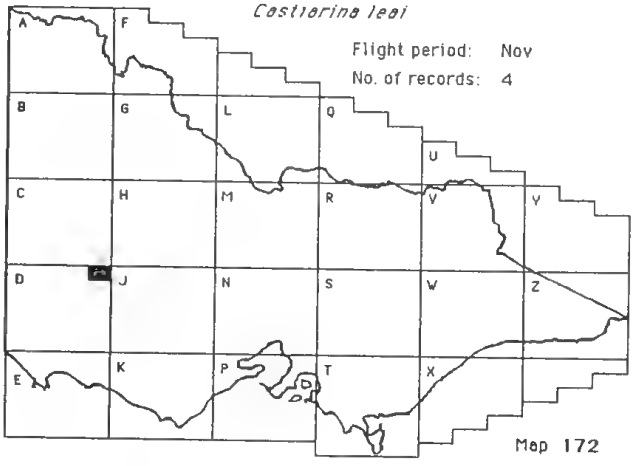
Flight period: Jan. & Feb.
No. of records: 4



Map 171

Castiarina leai

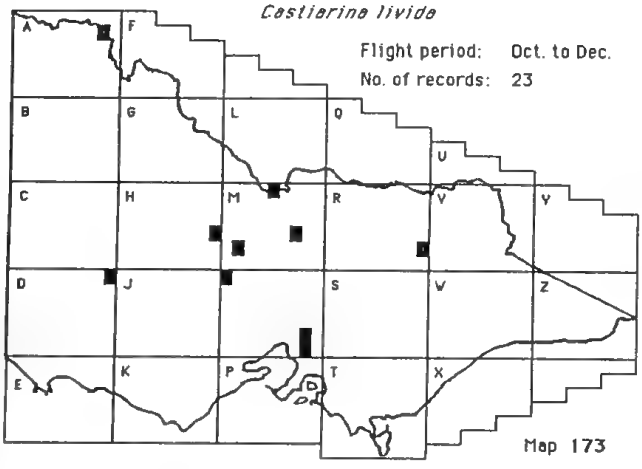
Flight period: Nov
No. of records: 4



Map 172

Castiarina livida

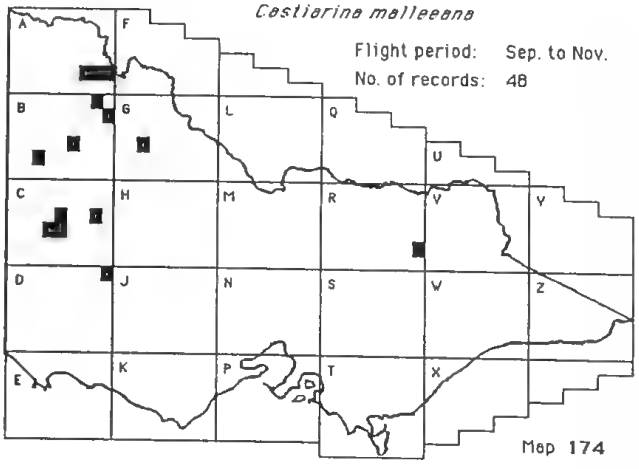
Flight period: Oct. to Dec.
No. of records: 23



Map 173

Castiarina malleeana

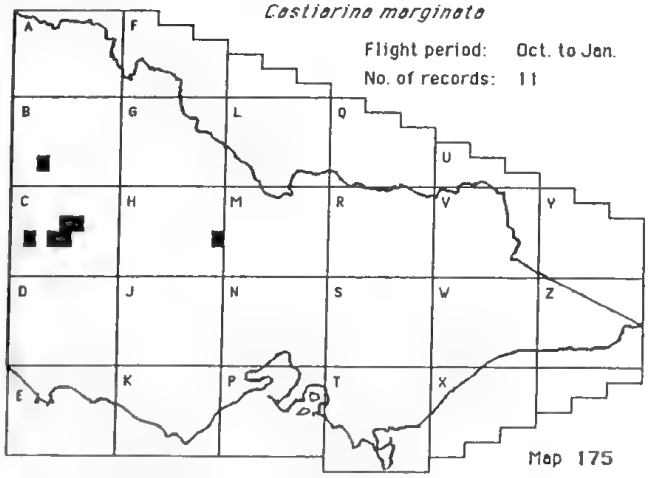
Flight period: Sep. to Nov.
No. of records: 48



Map 174

Castiarina marginata

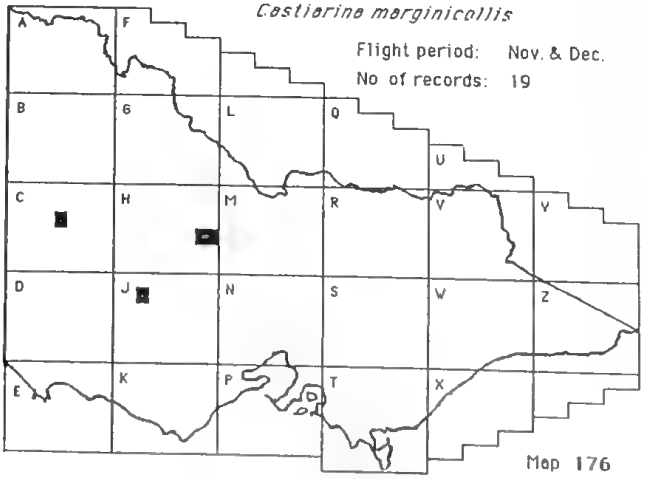
Flight period: Oct. to Jan.
No. of records: 11



Map 175

Castiarina marginicollis

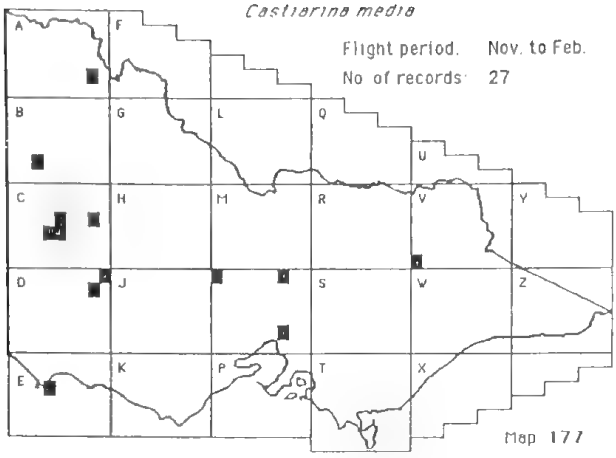
Flight period: Nov. & Dec.
No of records: 19



Map 176

Castiarina media

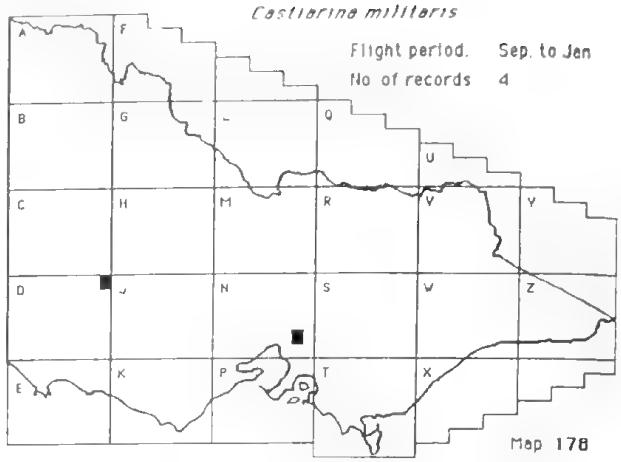
Flight period. Nov. to Feb.
No of records 27



Map 177

Castiarina militaris

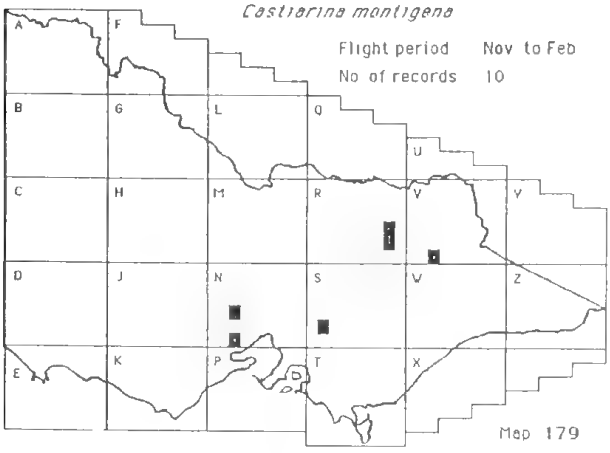
Flight period. Sep. to Jan
No of records 4



Map 178

Castiarina montigena

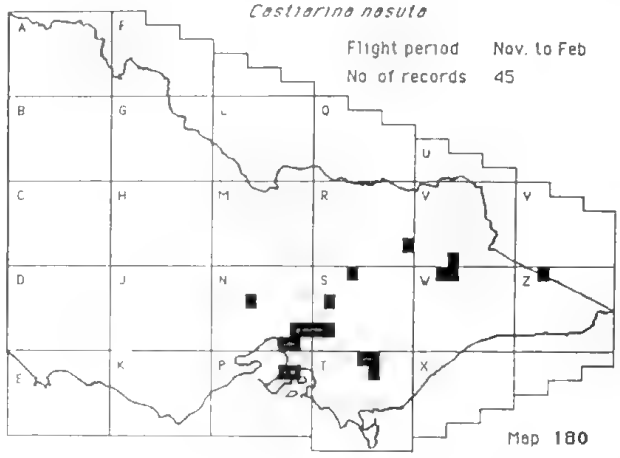
Flight period Nov to Feb
No of records 10



Map 179

Castiarina nasuta

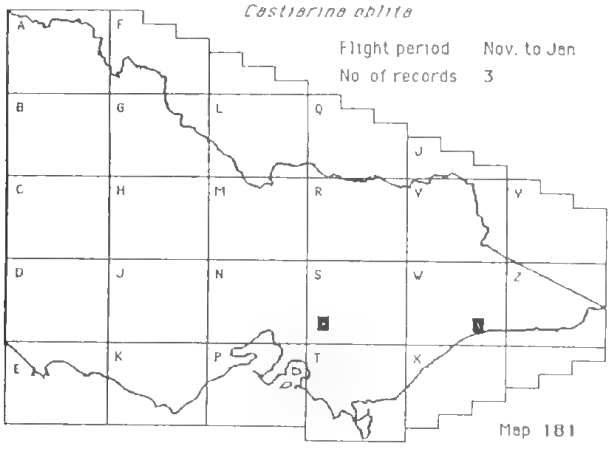
Flight period Nov. to Feb
No of records 45



Map 180

Castiarina oblita

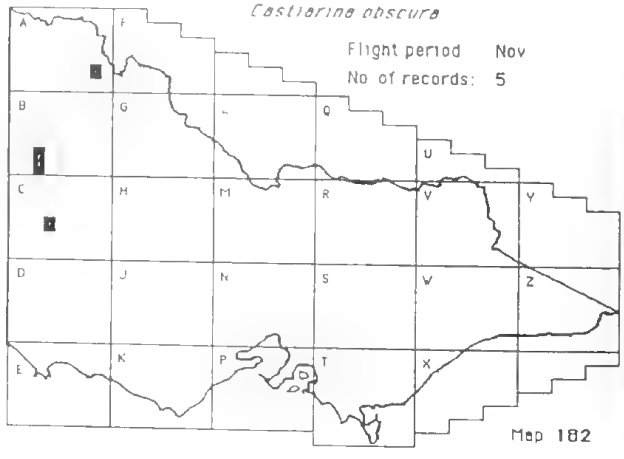
Flight period Nov. to Jan
No of records 3



Map 181

Castiarina obscura

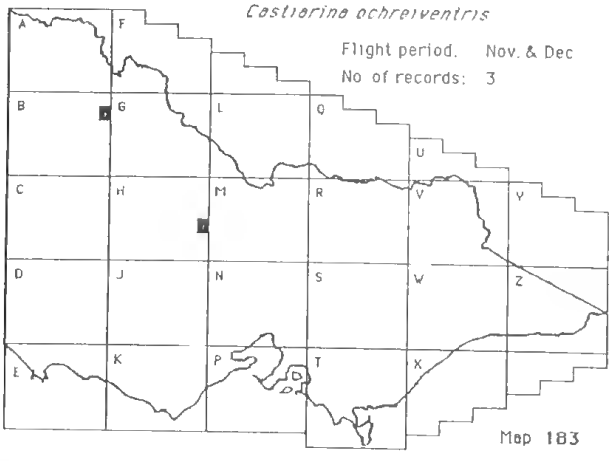
Flight period Nov
No of records: 5



Map 182

Castiarina ochreiventris

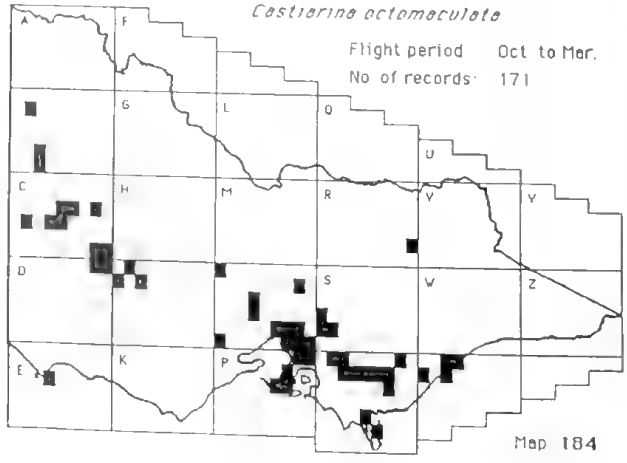
Flight period. Nov. & Dec
No of records: 3



Map 183

Castiarina octomaculata

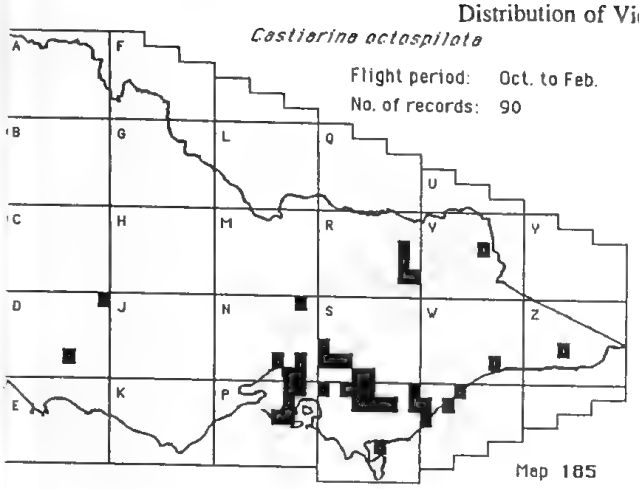
Flight period Oct to Mar.
No of records 171



Map 184

Castiarina octospilota

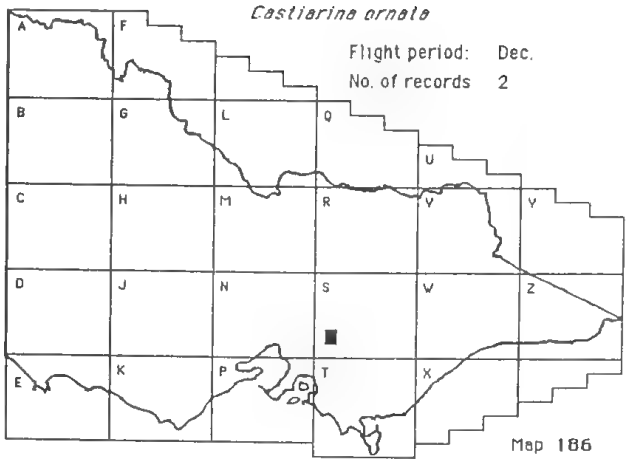
Flight period: Oct. to Feb.
No. of records: 90



Map 185

Castiarina ornata

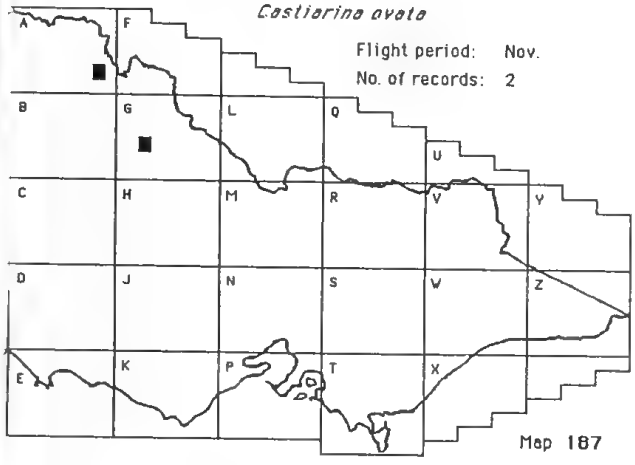
Flight period: Dec.
No. of records 2



Map 186

Castiarina ovata

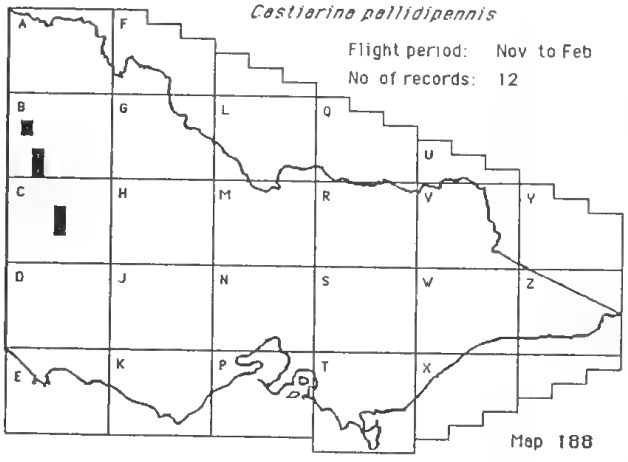
Flight period: Nov.
No. of records: 2



Map 187

Castiarina pallidipennis

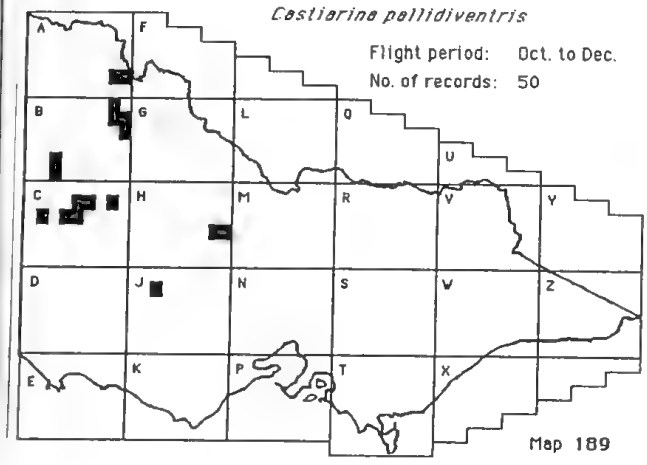
Flight period: Nov to Feb
No of records: 12



Map 188

Castiarina pallidiventris

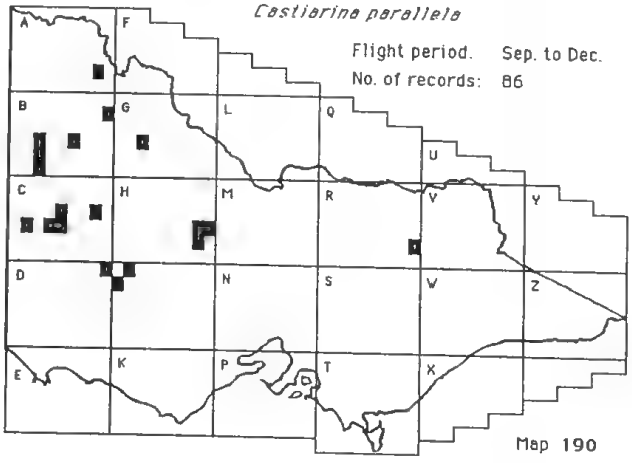
Flight period: Oct. to Dec.
No. of records: 50



Map 189

Castiarina parallela

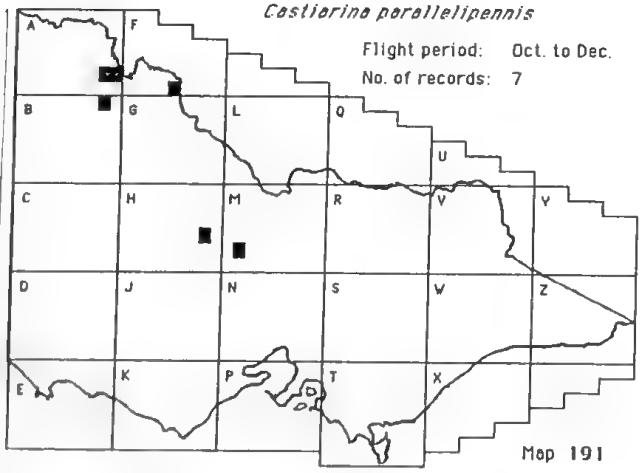
Flight period. Sep. to Dec.
No. of records: 86



Map 190

Castiarina parallelipennis

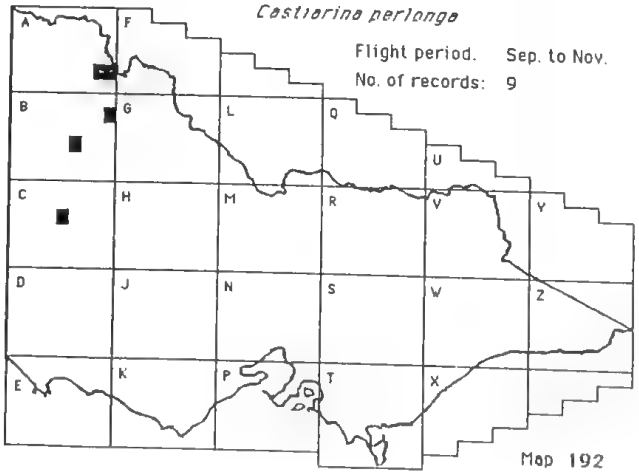
Flight period: Oct. to Dec.
No. of records: 7



Map 191

Castiarina perlonga

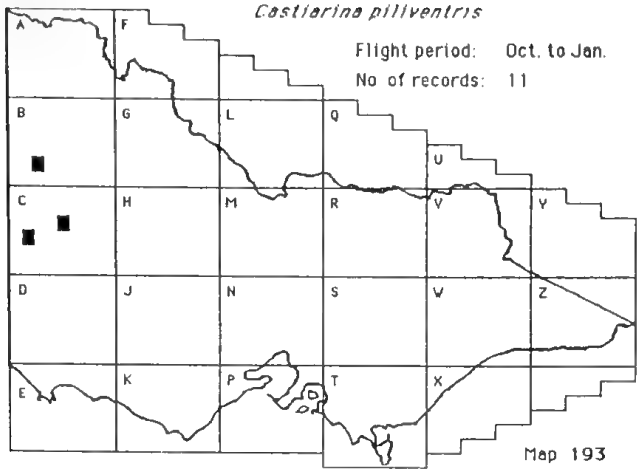
Flight period. Sep. to Nov.
No. of records: 9



Map 192

Castiarina piliventris

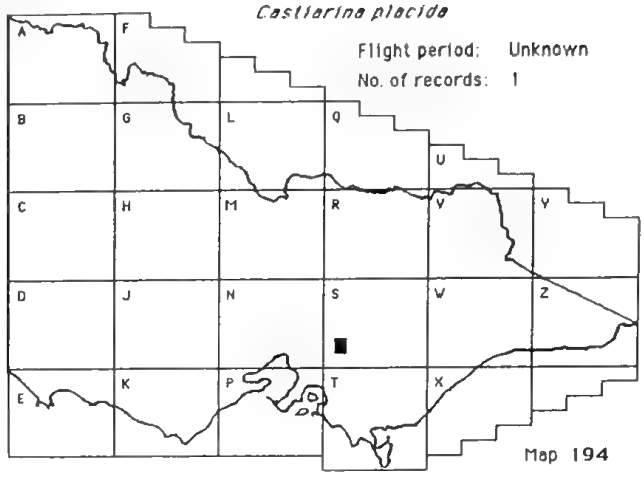
Flight period: Oct. to Jan.
No of records: 11



Map 193

Castiarina placida

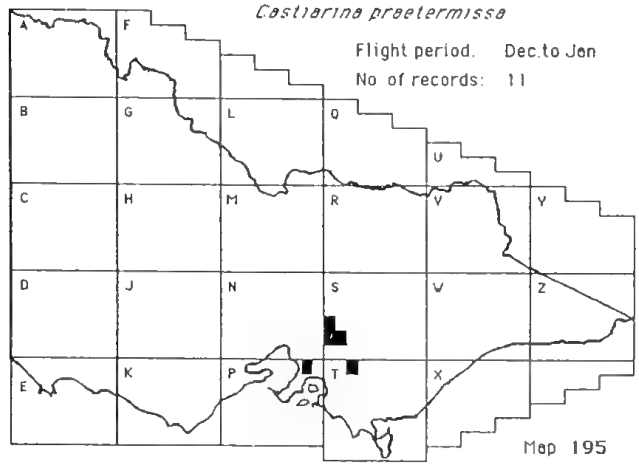
Flight period: Unknown
No. of records: 1



Map 194

Castiarina praetermissa

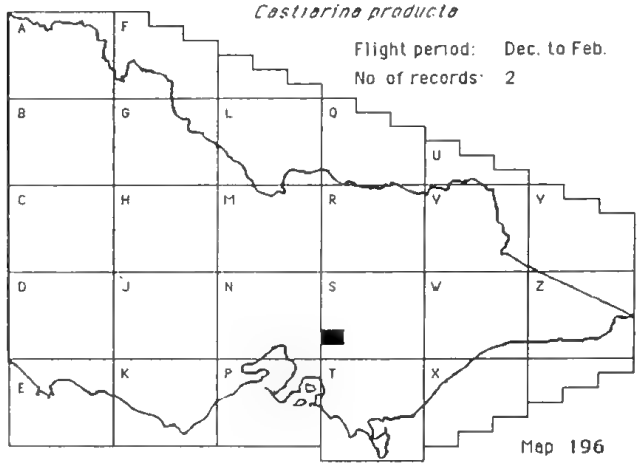
Flight period. Dec.to Jan
No of records: 11



Map 195

Castiarina producta

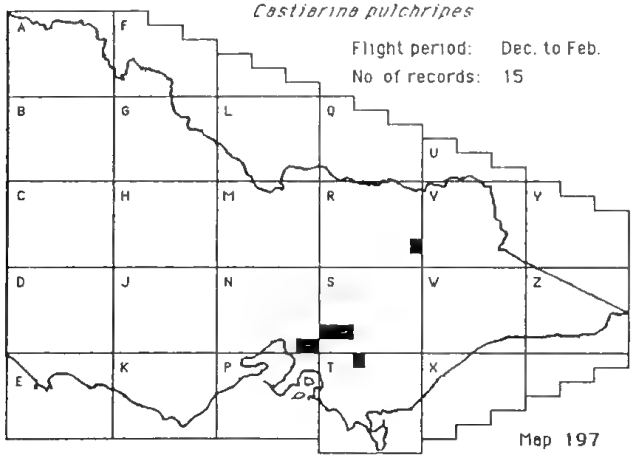
Flight period: Dec. to Feb.
No of records: 2



Map 196

Castiarina pulchripes

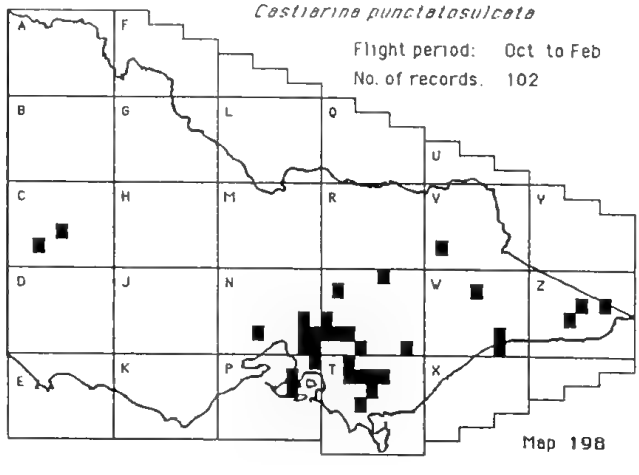
Flight period: Dec. to Feb.
No of records: 15



Map 197

Castiarina punctatosulcata

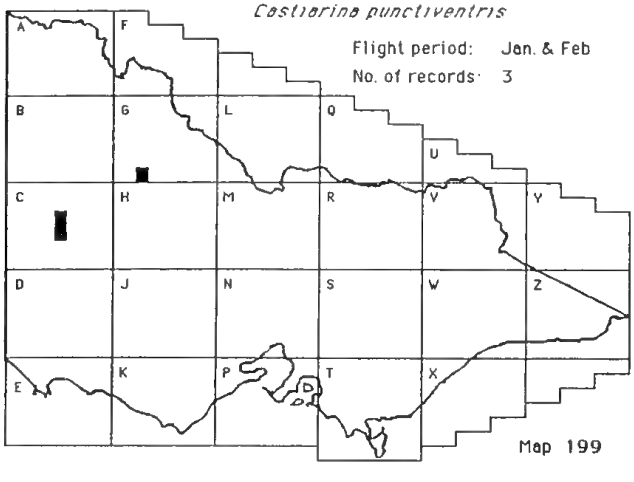
Flight period: Oct to Feb
No. of records. 102



Map 198

Castiarina punctiventris

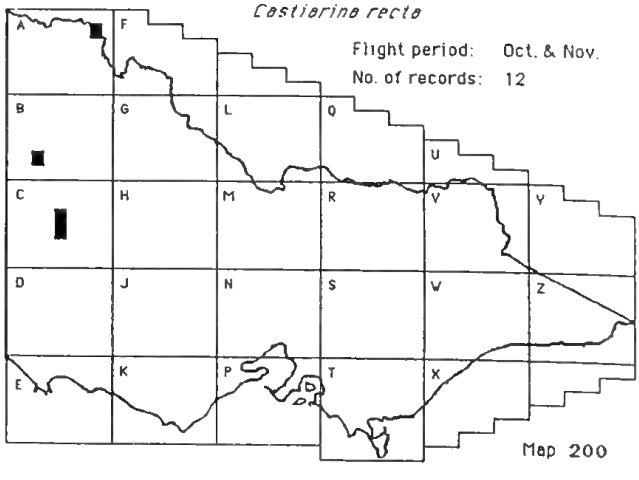
Flight period: Jan. & Feb
No. of records: 3



Map 199

Castiarina recta

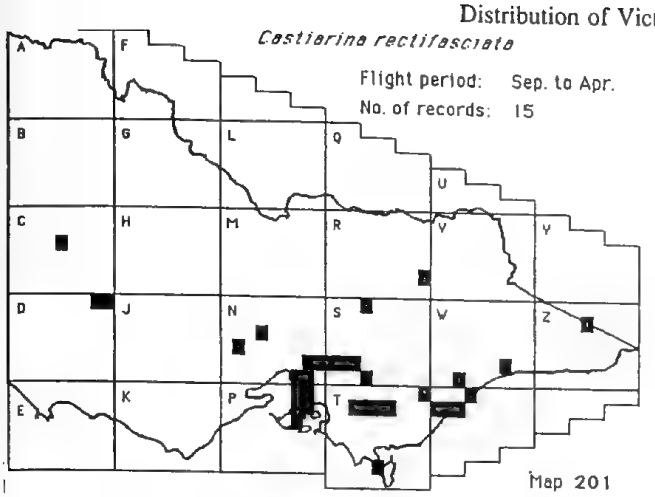
Flight period: Oct. & Nov.
No. of records: 12



Map 200

Castiarina rectifasciata

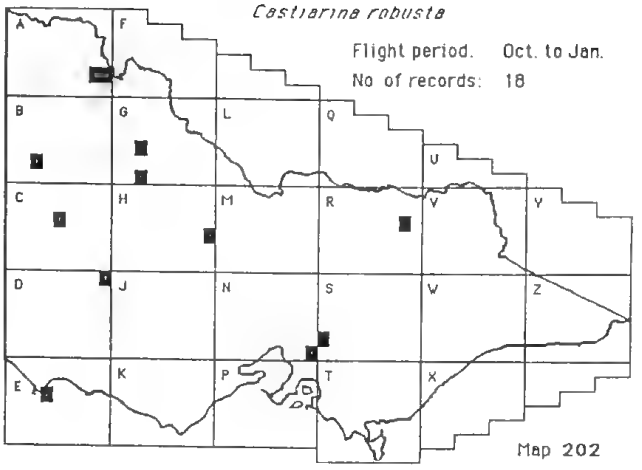
Flight period: Sep. to Apr.
No. of records: 15



Map 201

Castiarina robusta

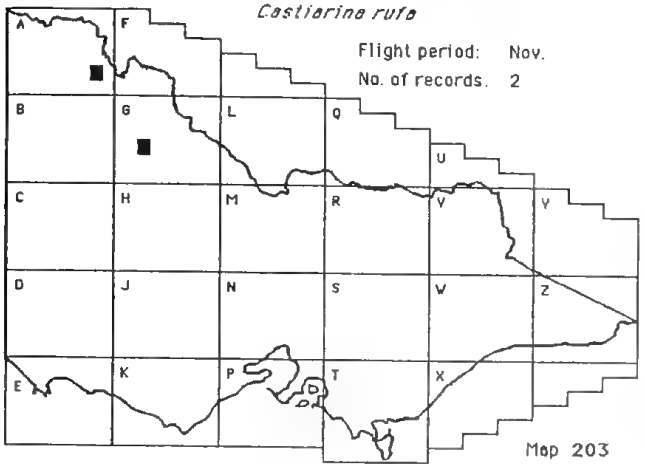
Flight period. Oct. to Jan.
No. of records: 18



Map 202

Castiarina rufa

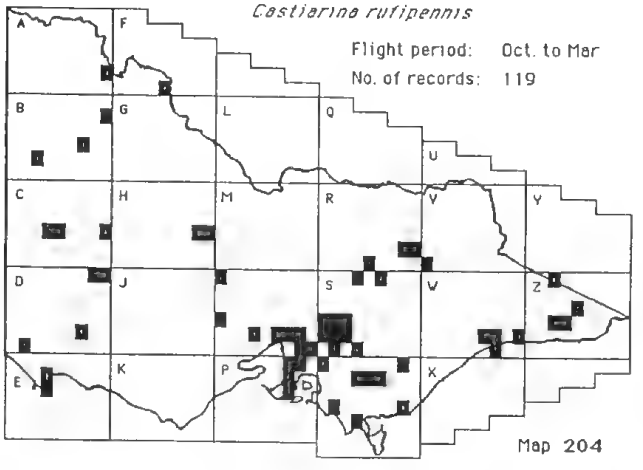
Flight period: Nov.
No. of records. 2



Map 203

Castiarina rufipennis

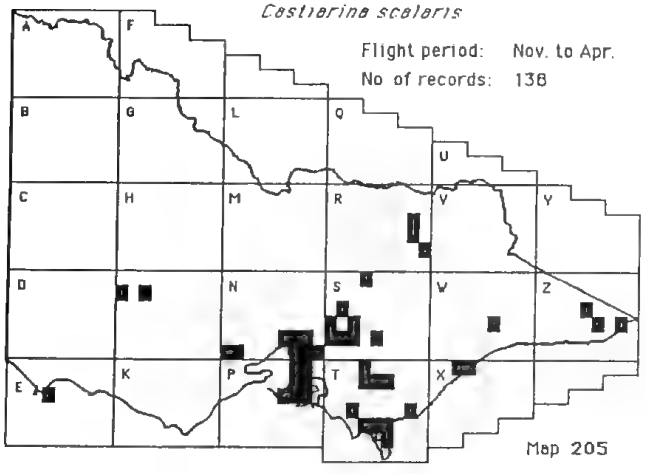
Flight period: Oct. to Mar
No. of records: 119



Map 204

Castiarina scalaris

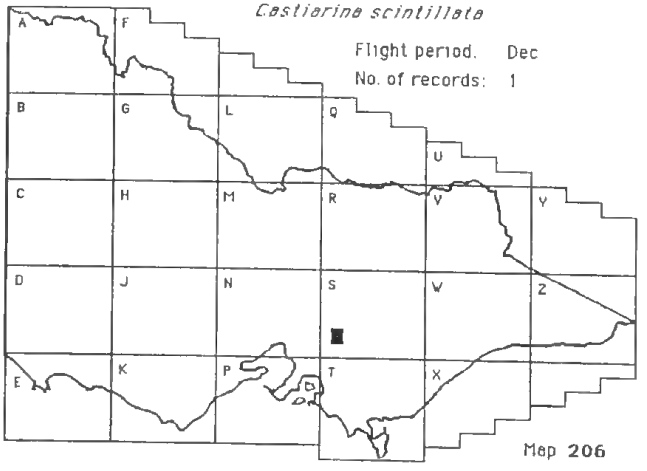
Flight period: Nov. to Apr.
No of records: 138



Map 205

Castiarina scintillata

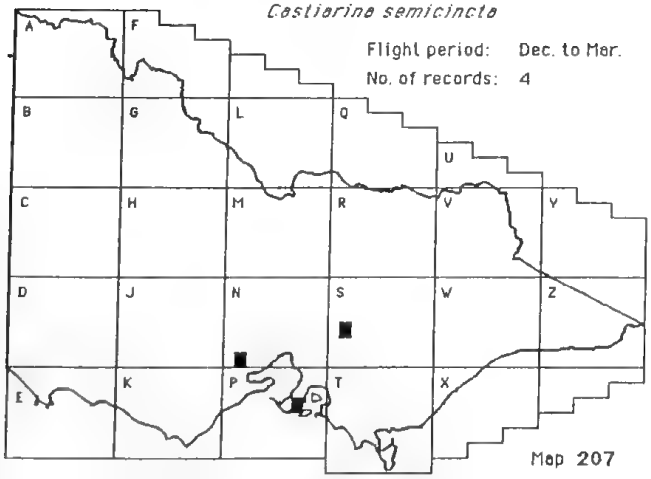
Flight period. Dec
No. of records: 1



Map 206

Castiarina semicincta

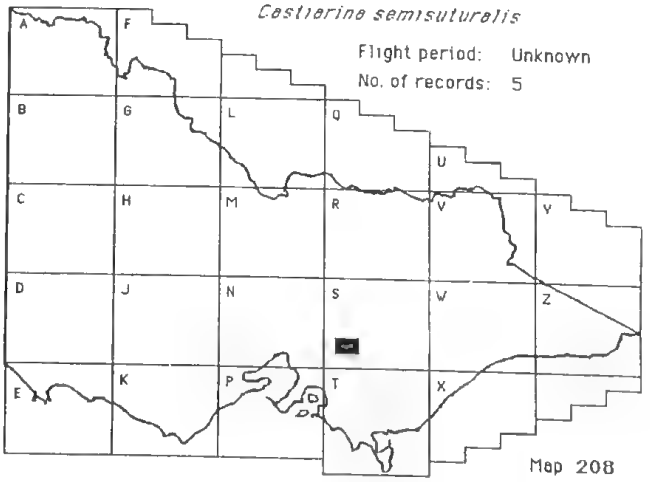
Flight period: Dec. to Mar.
No. of records: 4



Map 207

Castiarina semisuturalis

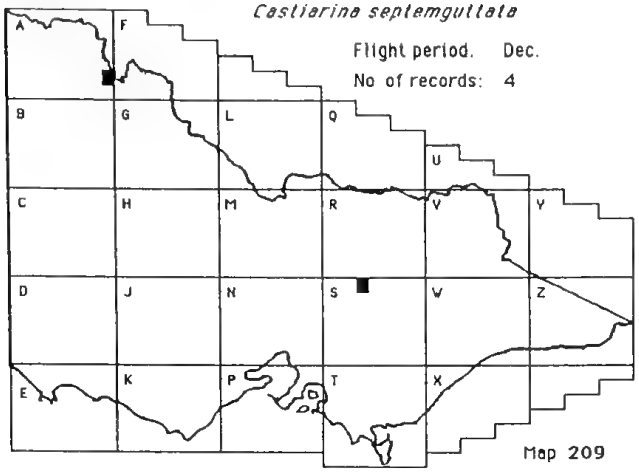
Flight period: Unknown
No. of records: 5



Map 208

Castiarina septemguttata

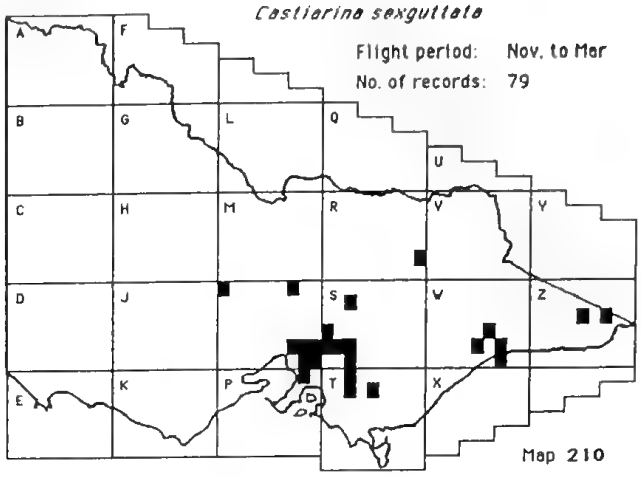
Flight period. Dec.
No of records: 4



Map 209

Castiarina sexguttata

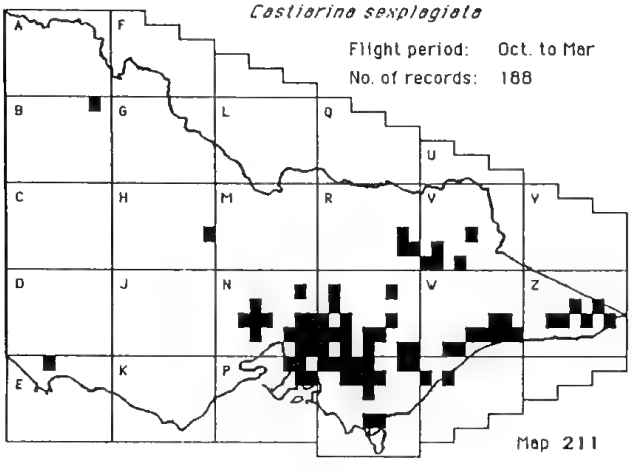
Flight period: Nov. to Mar
No. of records: 79



Map 210

Castiarina sexplagiata

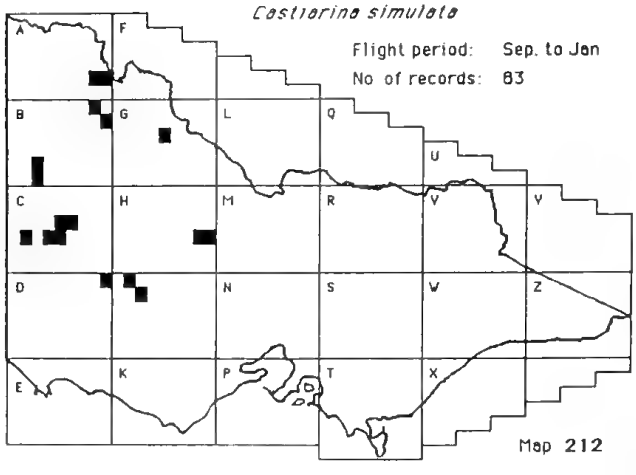
Flight period: Oct. to Mar
No. of records: 188



Map 211

Castiarina simulata

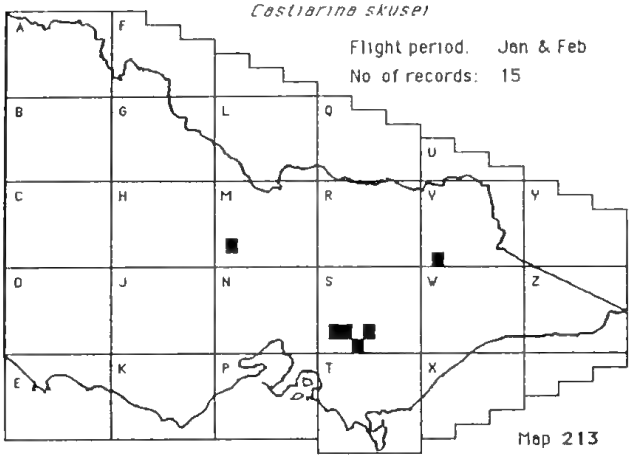
Flight period: Sep. to Jan
No of records: 83



Map 212

Castiarina skusei

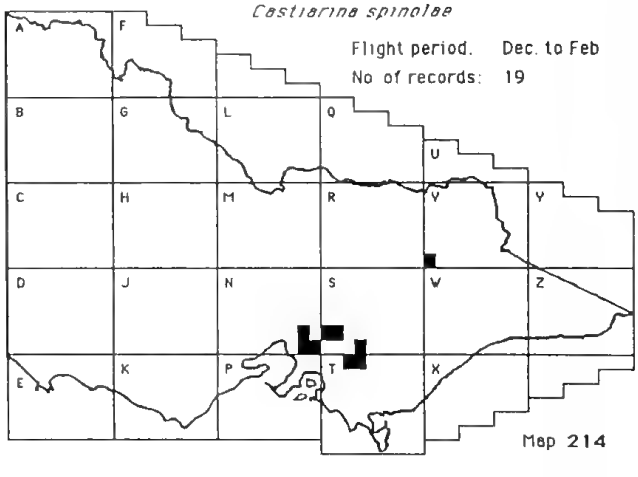
Flight period. Jan & Feb
No of records: 15



Map 213

Castiarina spinolae

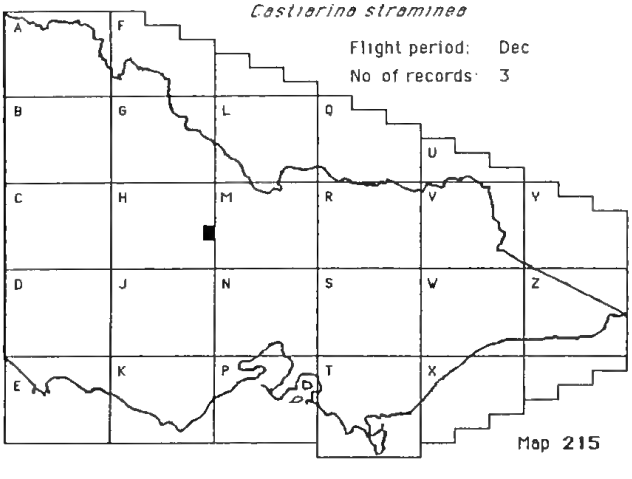
Flight period. Dec. to Feb
No of records: 19



Map 214

Castiarina straminea

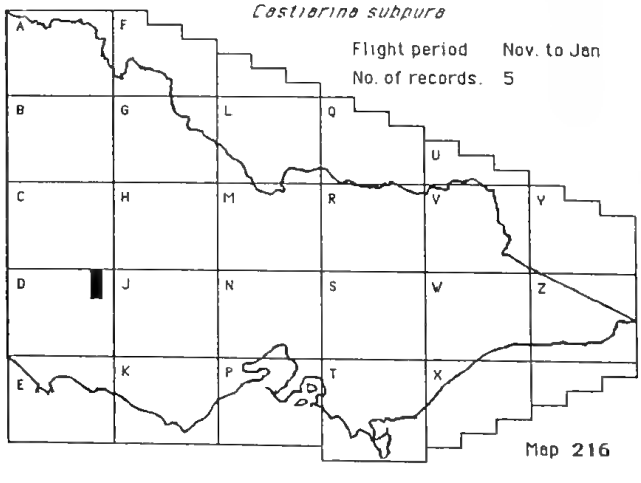
Flight period: Dec
No of records: 3



Map 215

Castiarina subpura

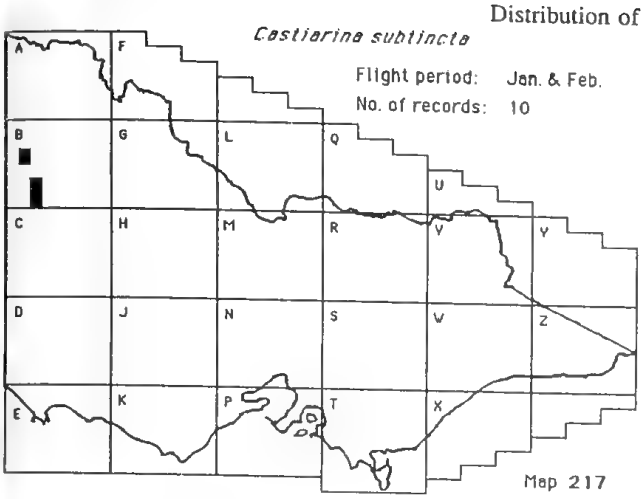
Flight period Nov. to Jan
No. of records. 5



Map 216

Castiarina subtincta

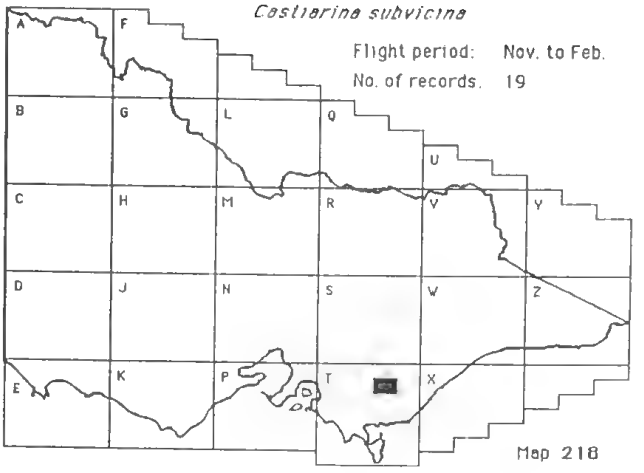
Flight period: Jan. & Feb.
No. of records: 10



Map 217

Castiarina subvicina

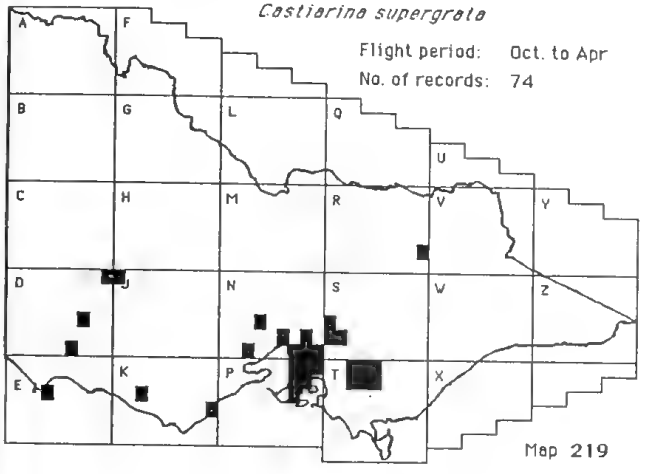
Flight period: Nov. to Feb.
No. of records: 19



Map 218

Castiarina supergrata

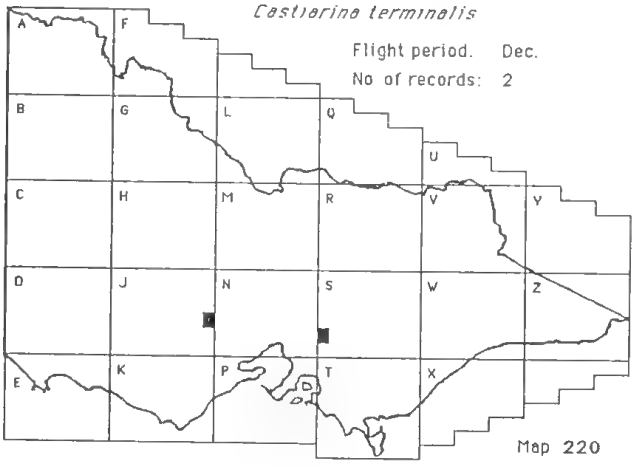
Flight period: Oct. to Apr
No. of records: 74



Map 219

Castiarina terminalis

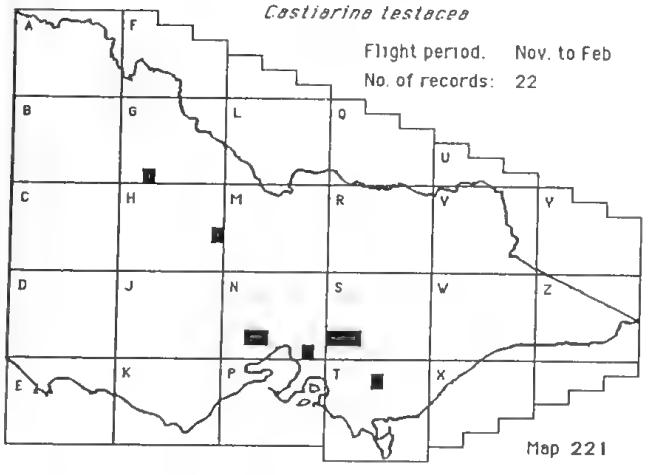
Flight period. Dec.
No of records: 2



Map 220

Castiarina testacea

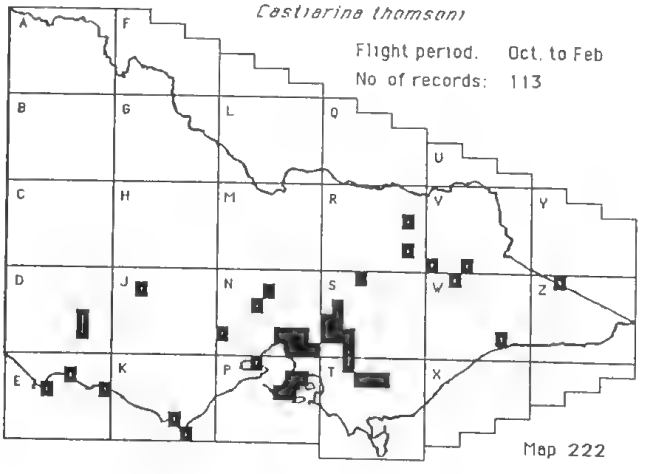
Flight period. Nov. to Feb
No. of records: 22



Map 221

Castiarina thomsoni

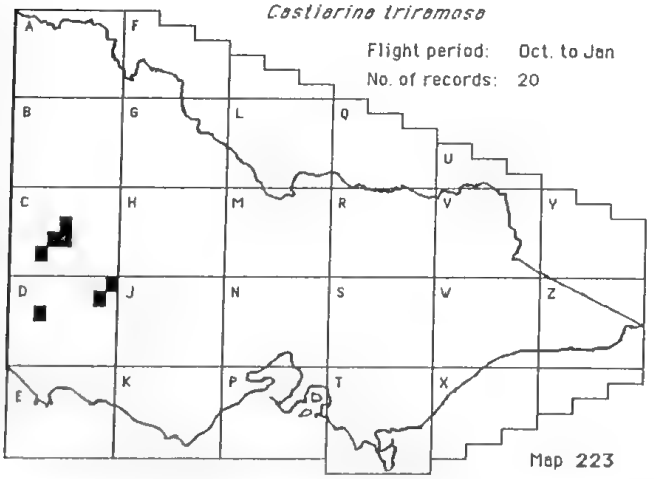
Flight period. Oct. to Feb
No of records: 113



Map 222

Castiarina triramosa

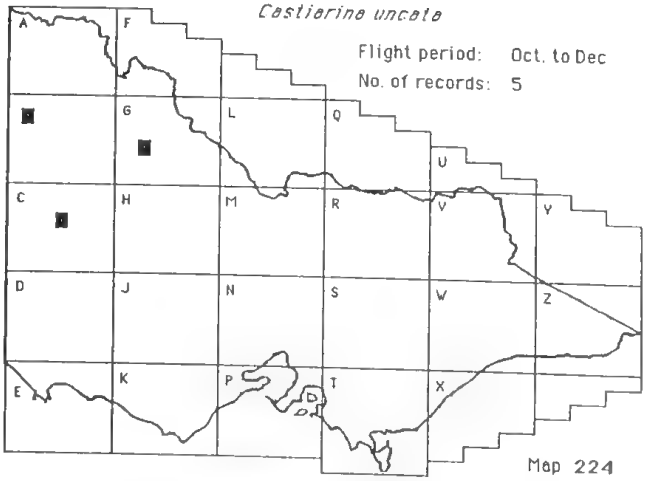
Flight period: Oct. to Jan
No. of records: 20



Map 223

Castiarina uncata

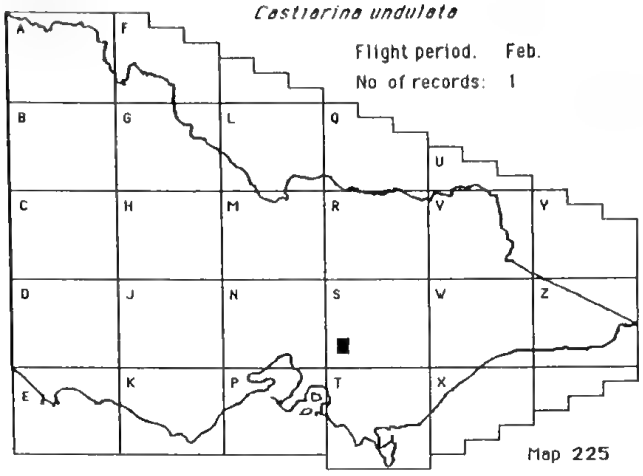
Flight period: Oct. to Dec
No. of records: 5



Map 224

Castiarina undulata

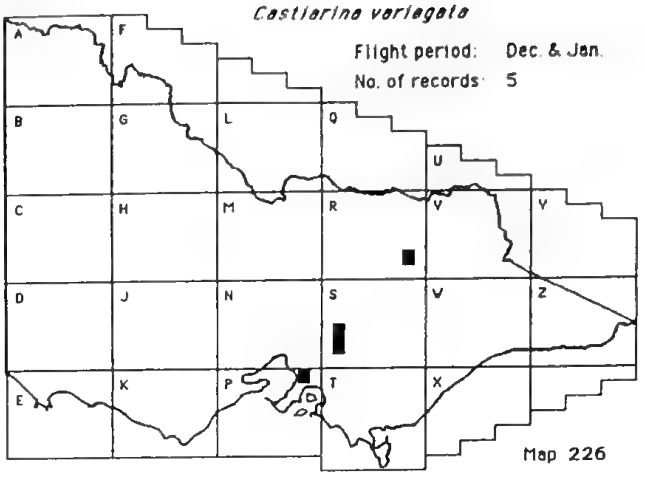
Flight period. Feb.
No of records: 1



Map 225

Castiarina variegata

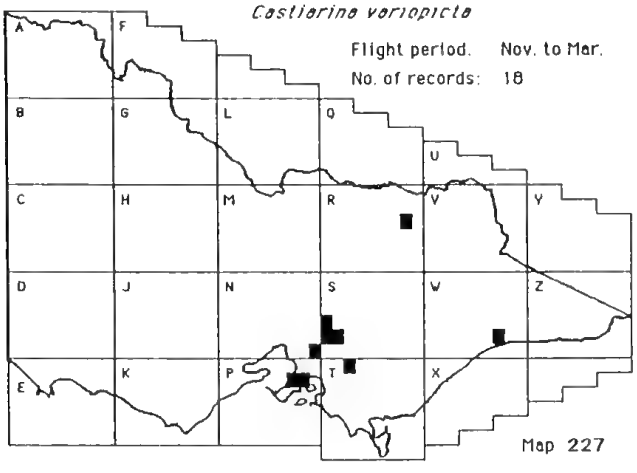
Flight period: Dec. & Jan.
No. of records: 5



Map 226

Castiarina variopicta

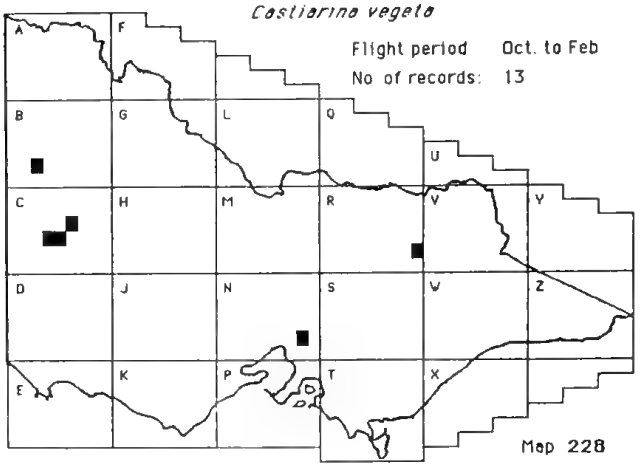
Flight period. Nov. to Mar.
No. of records: 18



Map 227

Castiarina vegeta

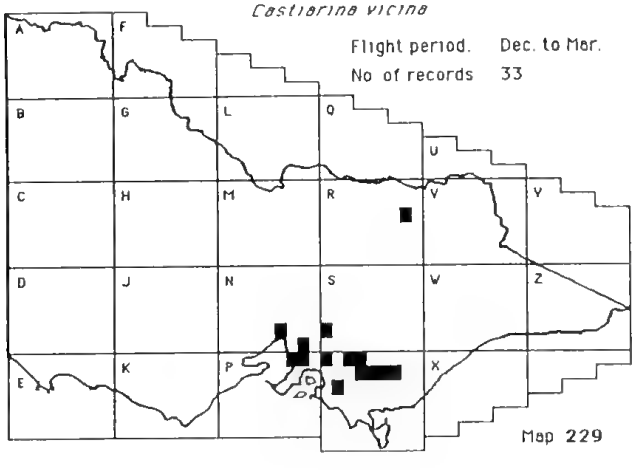
Flight period Oct. to Feb
No of records: 13



Map 228

Castiarina vicina

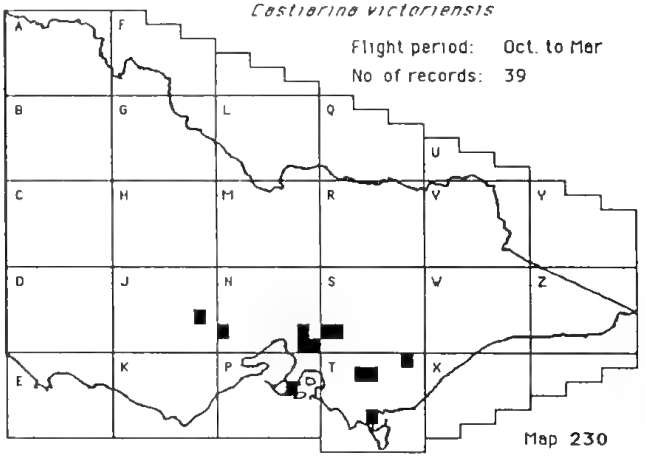
Flight period. Dec. to Mar.
No of records 33



Map 229

Castiarina victoriensis

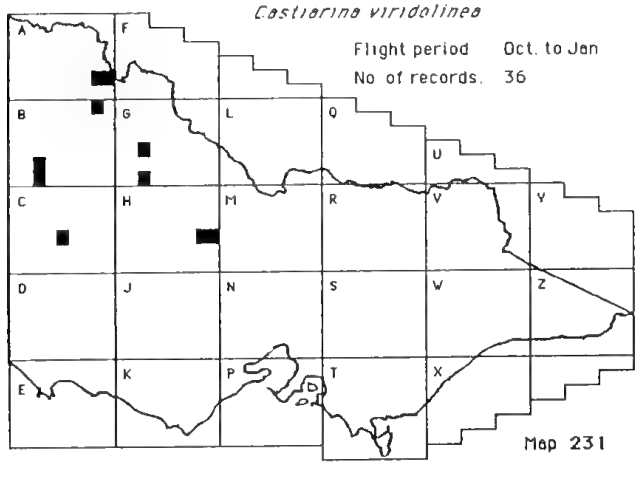
Flight period: Oct. to Mar
No of records: 39



Map 230

Castiarina viridolinea

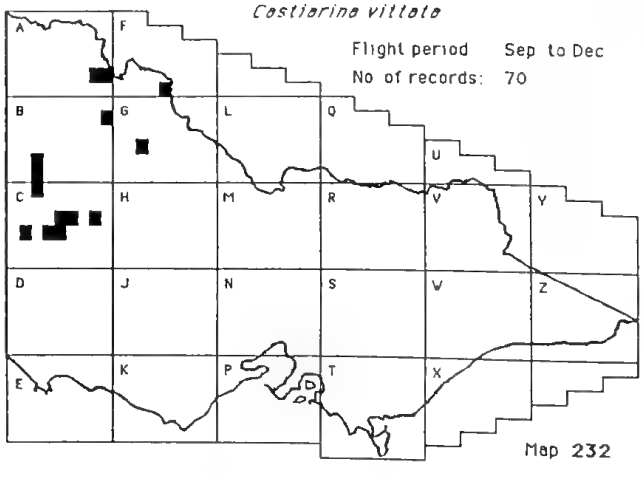
Flight period Oct. to Jan
No of records. 36



Map 231

Castiarina vittata

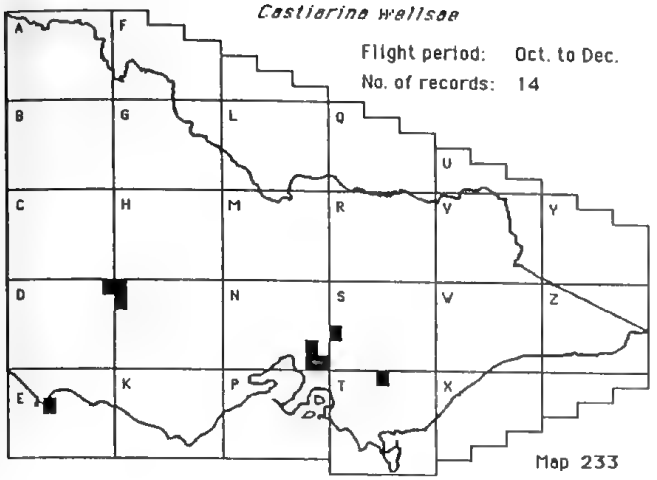
Flight period Sep to Dec
No of records: 70



Map 232

Castiarina wellsae

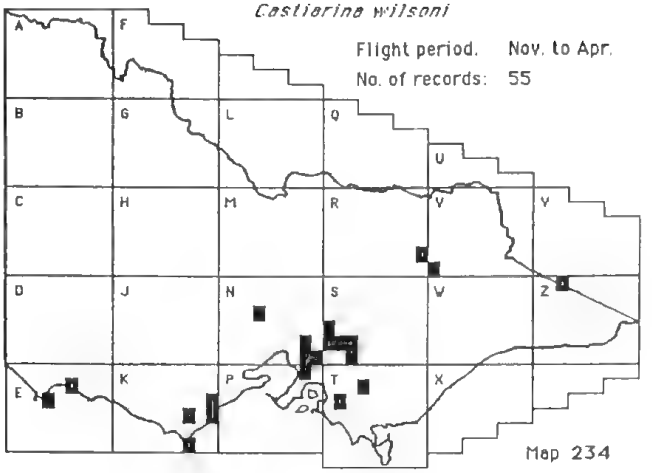
Flight period: Oct. to Dec.
No. of records: 14



Map 233

Castiarina wilsoni

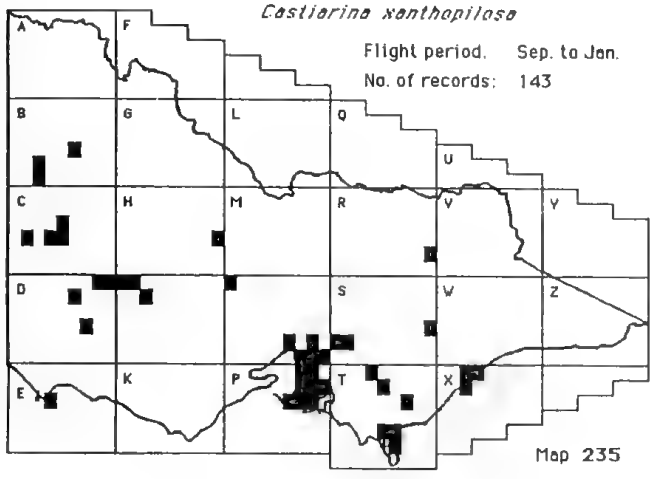
Flight period. Nov. to Apr.
No. of records: 55



Map 234

Castiarina xanthopilosa

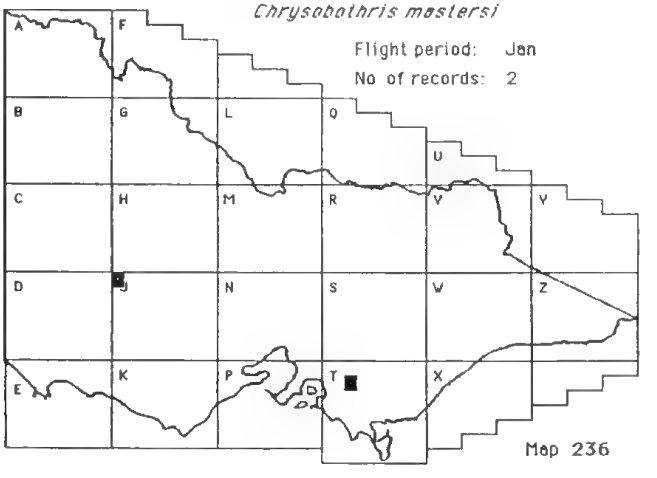
Flight period. Sep. to Jan.
No. of records: 143



Map 235

Chrysobothris mastersi

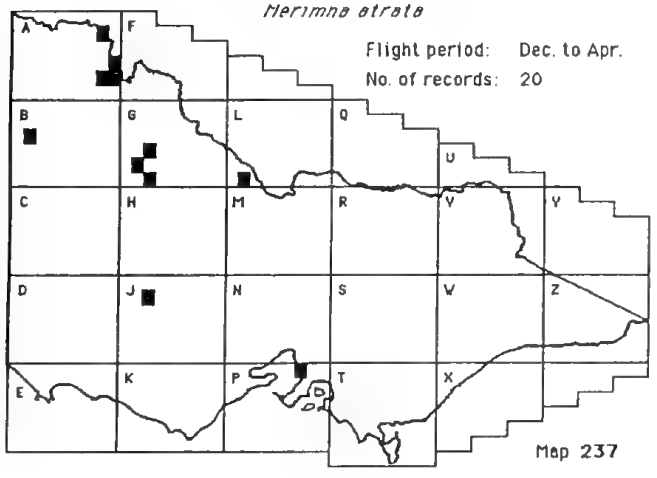
Flight period: Jan
No of records: 2



Map 236

Merimna atrata

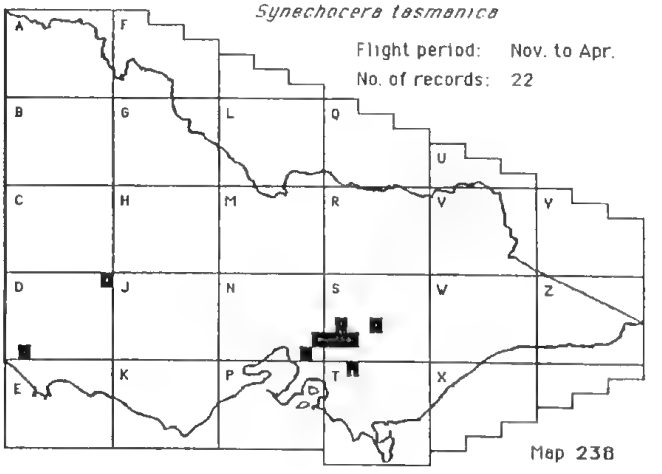
Flight period: Dec. to Apr.
No. of records: 20



Map 237

Synechocera tasmanica

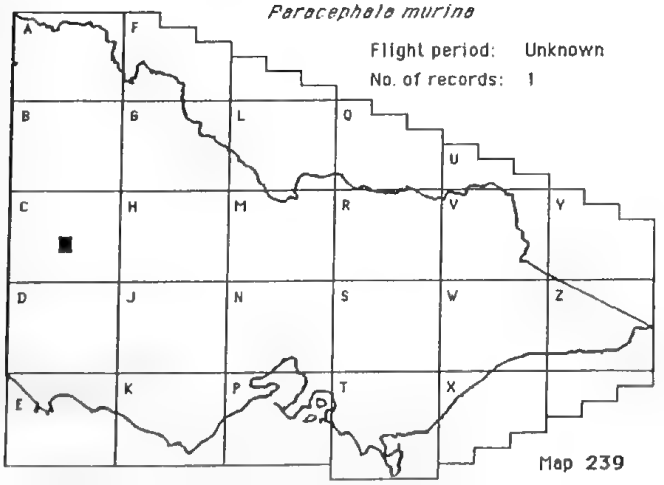
Flight period: Nov. to Apr.
No. of records: 22



Map 238

Paracephala murina

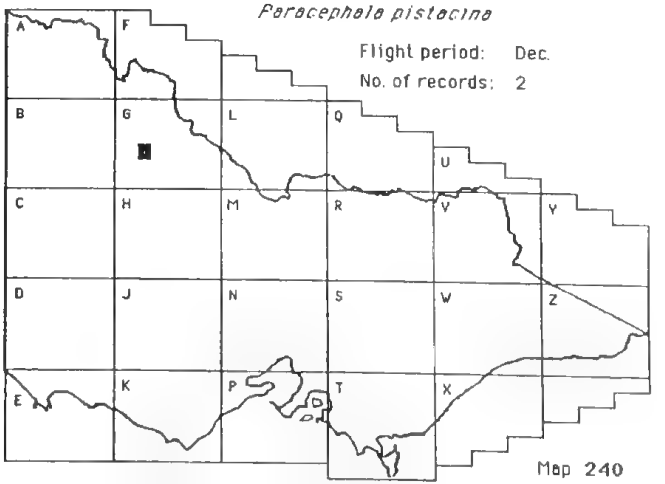
Flight period: Unknown
No. of records: 1



Map 239

Paracephala pistacina

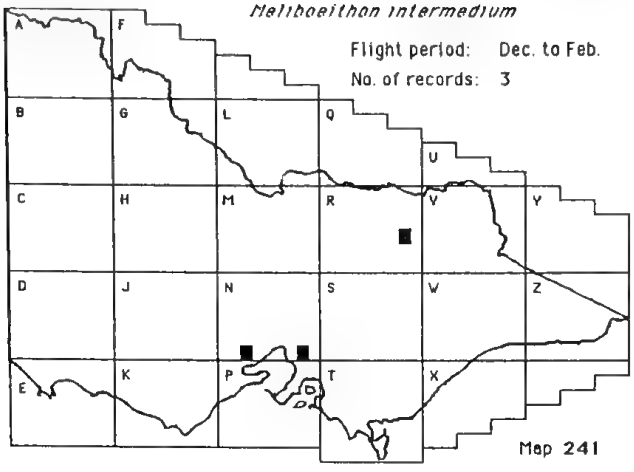
Flight period: Dec.
No. of records: 2



Map 240

Melthoeithon intermedium

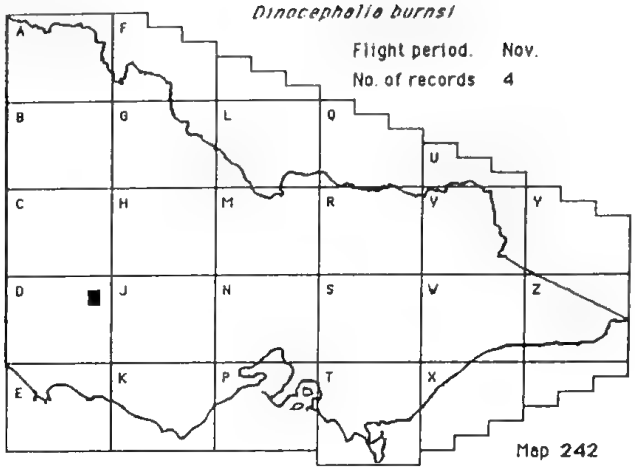
Flight period: Dec. to Feb.
No. of records: 3



Map 241

Dinocephalia burnsi

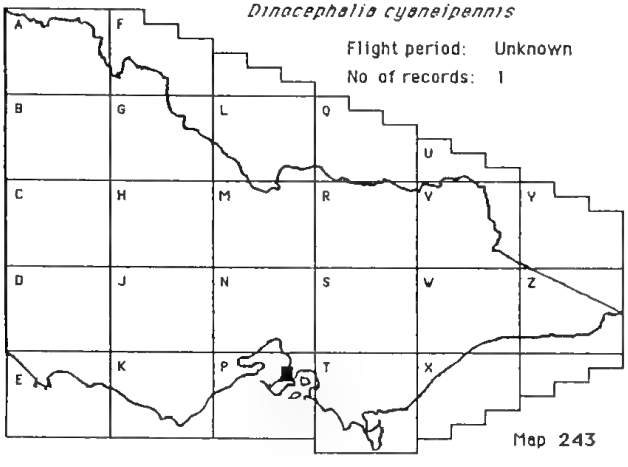
Flight period. Nov.
No. of records 4



Map 242

Dinocephalia cyaneipennis

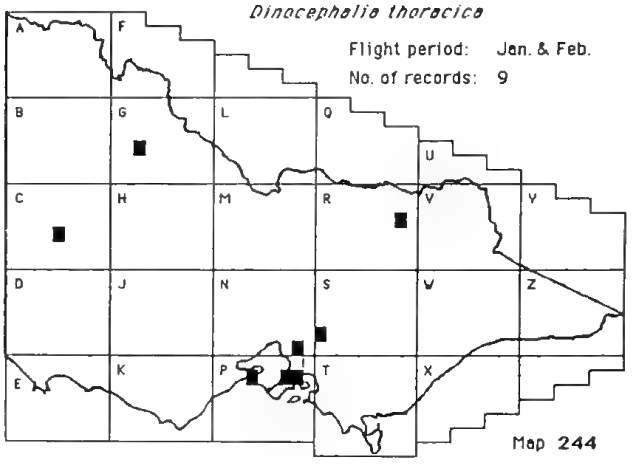
Flight period: Unknown
No of records: 1



Map 243

Dinocephalia thoracica

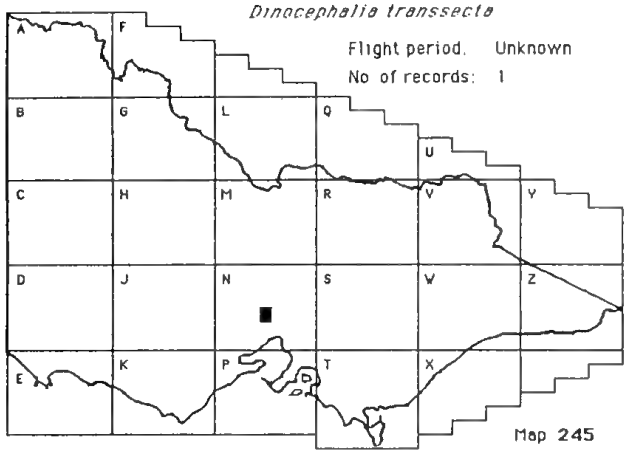
Flight period: Jan. & Feb.
No. of records: 9



Map 244

Dinocephalia transsecta

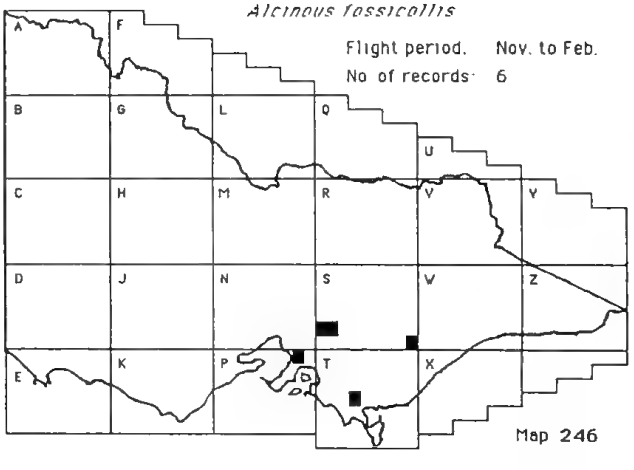
Flight period. Unknown
No of records: 1



Map 245

Alcinous fossicollis

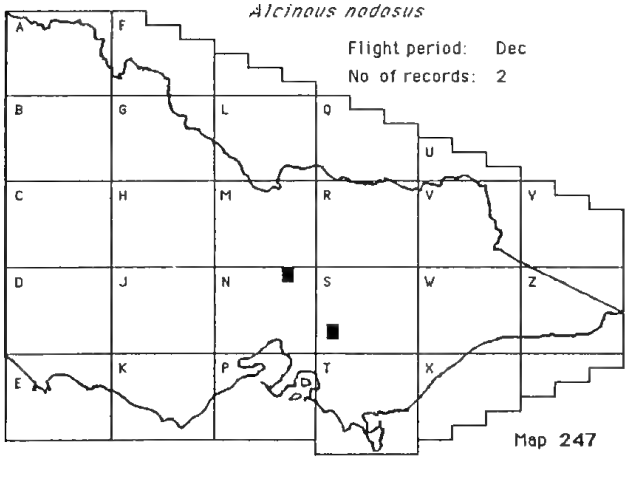
Flight period. Nov. to Feb.
No of records: 6



Map 246

Alcinous nodosus

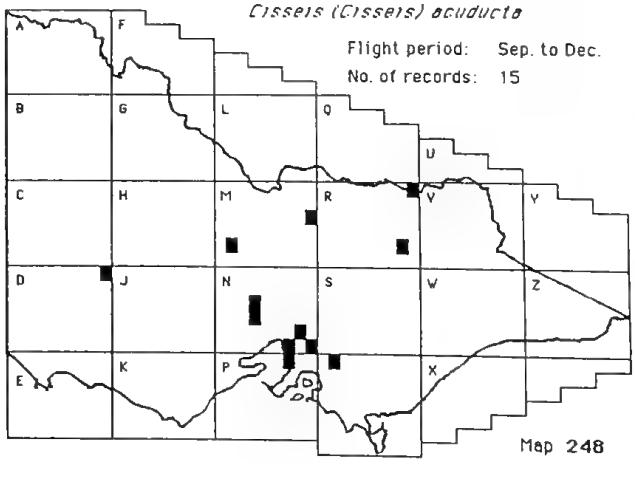
Flight period: Dec
No of records: 2



Map 247

Cisseis (Cisseis) aeuducta

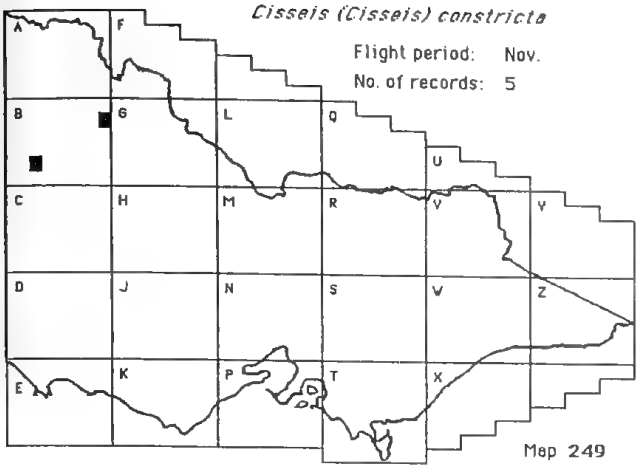
Flight period: Sep. to Dec.
No. of records: 15



Map 248

Cisseis (Cisseis) constricta

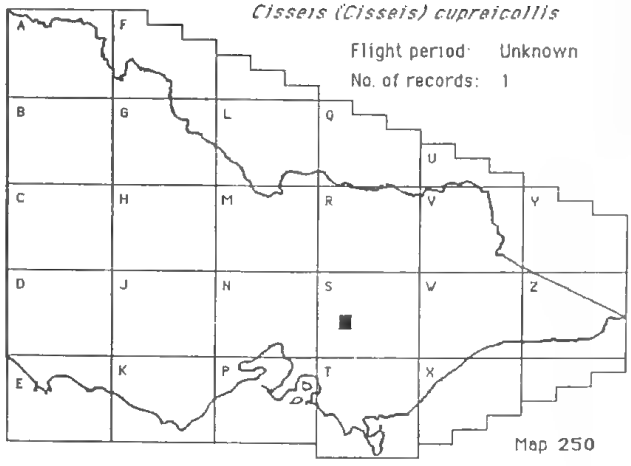
Flight period: Nov.
No. of records: 5



Map 249

Cisseis (Cisseis) cupreicollis

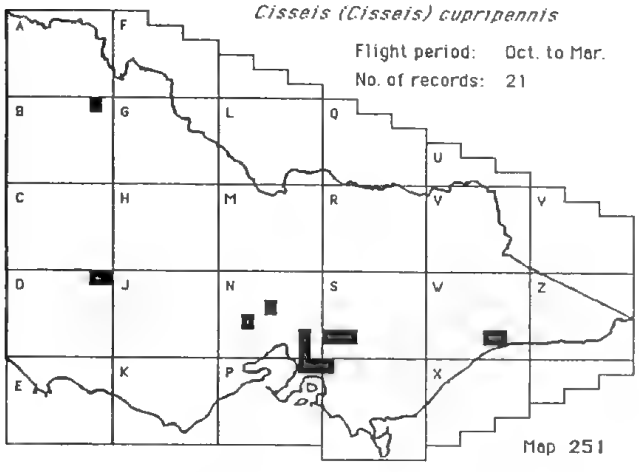
Flight period: Unknown
No. of records: 1



Map 250

Cisseis (Cisseis) cupripennis

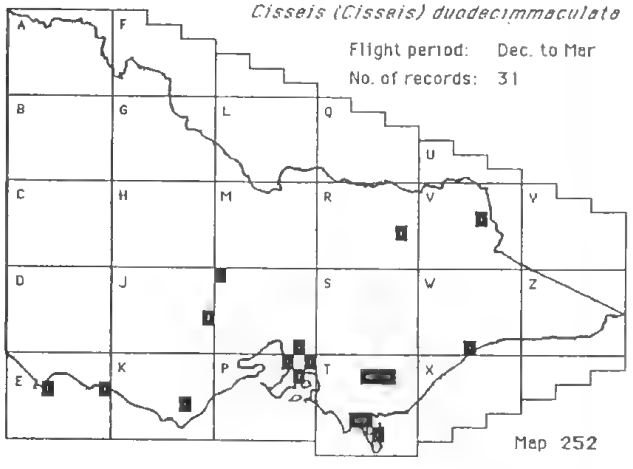
Flight period: Oct. to Mar.
No. of records: 21



Map 251

Cisseis (Cisseis) duodecimmaculata

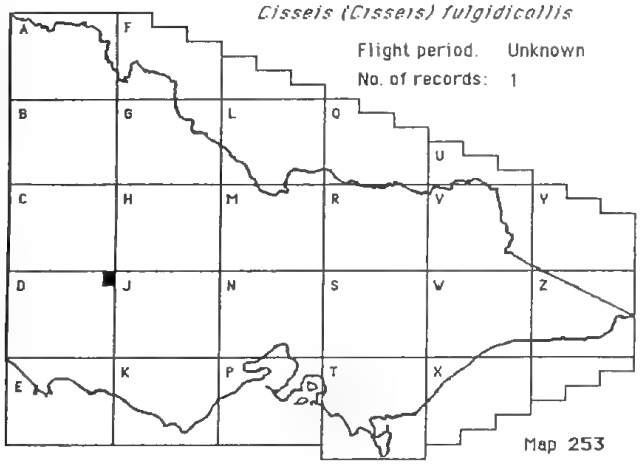
Flight period: Dec. to Mar
No. of records: 31



Map 252

Cisseis (Cisseis) fulgidicollis

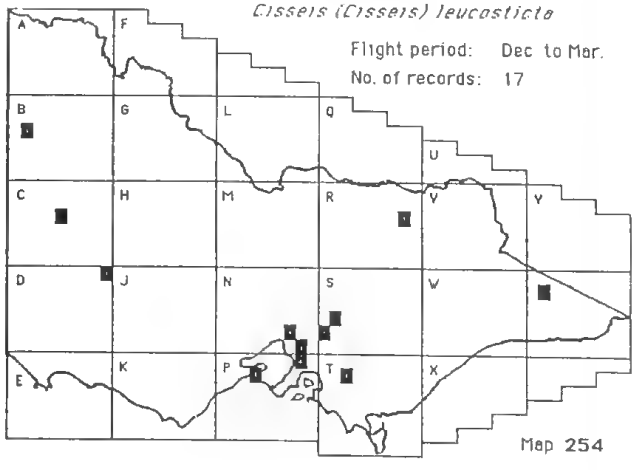
Flight period. Unknown
No. of records: 1



Map 253

Cisseis (Cisseis) leucosticta

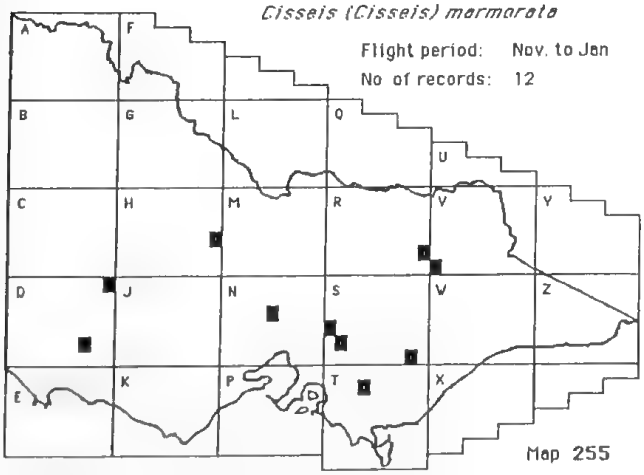
Flight period: Dec to Mar.
No. of records: 17



Map 254

Cisseis (Cisseis) marmorata

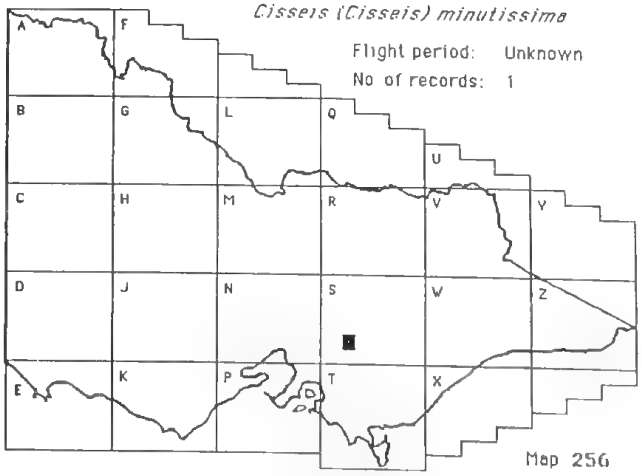
Flight period: Nov. to Jan
No of records: 12



Map 255

Cisseis (Cisseis) minutissima

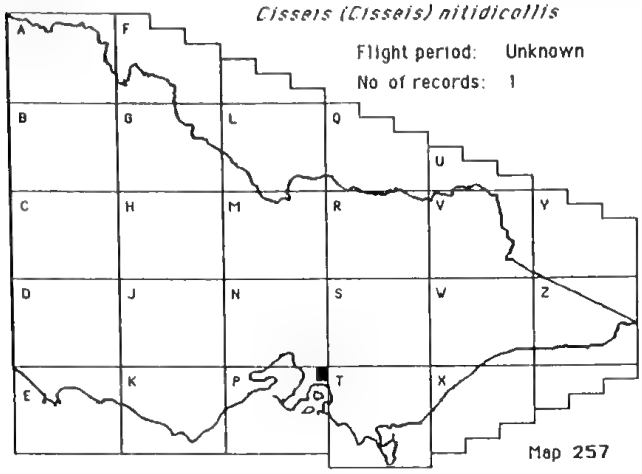
Flight period: Unknown
No of records: 1



Map 256

Cissels (Cissels) nitidicollis

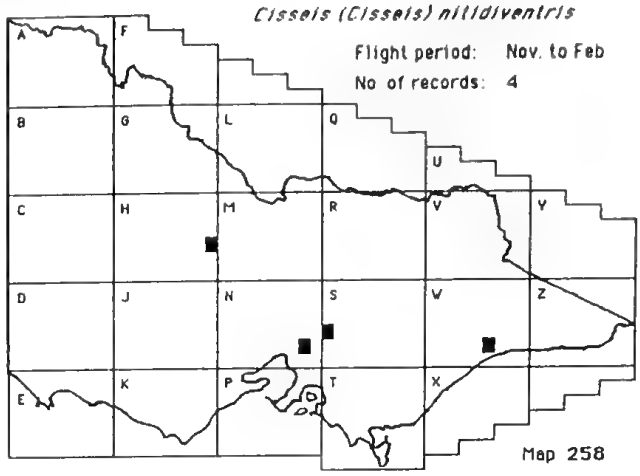
Flight period: Unknown
No of records: 1



Map 257

Cissels (Cissels) nitidiventris

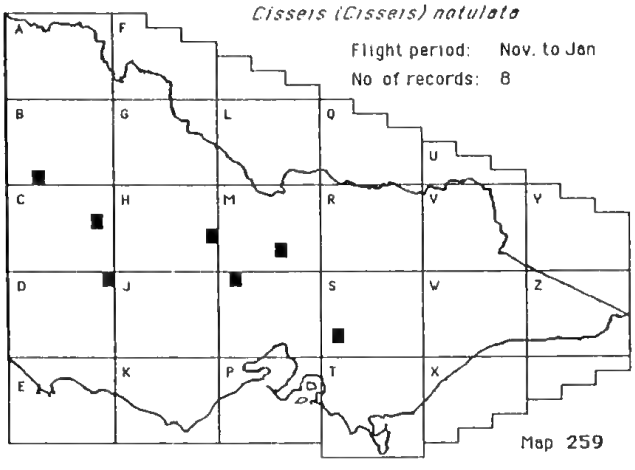
Flight period: Nov. to Feb
No of records: 4



Map 258

Cissels (Cissels) notulata

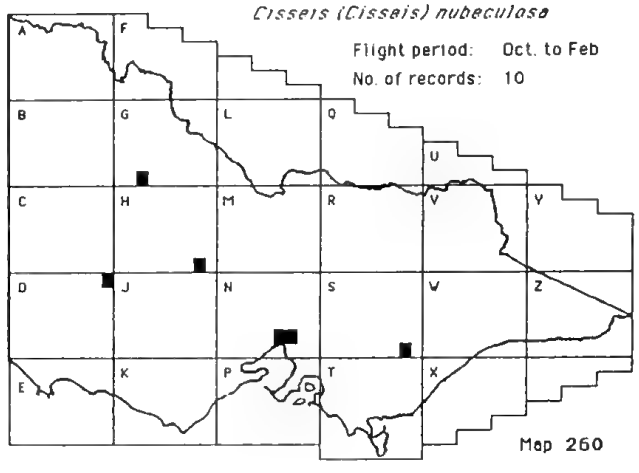
Flight period: Nov. to Jan
No of records: 8



Map 259

Cissels (Cissels) nubeculosa

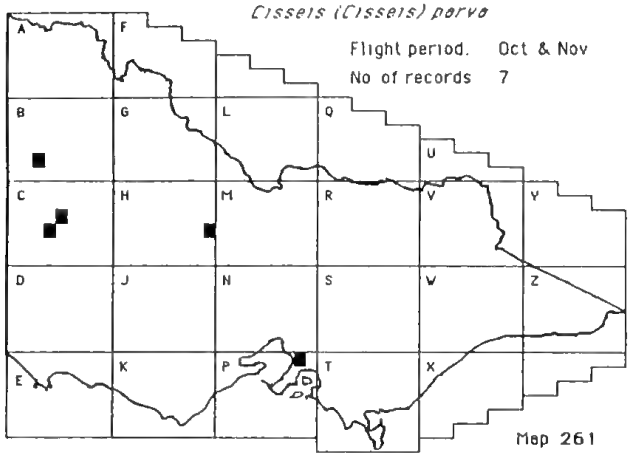
Flight period: Oct. to Feb
No. of records: 10



Map 260

Cissels (Cissels) parva

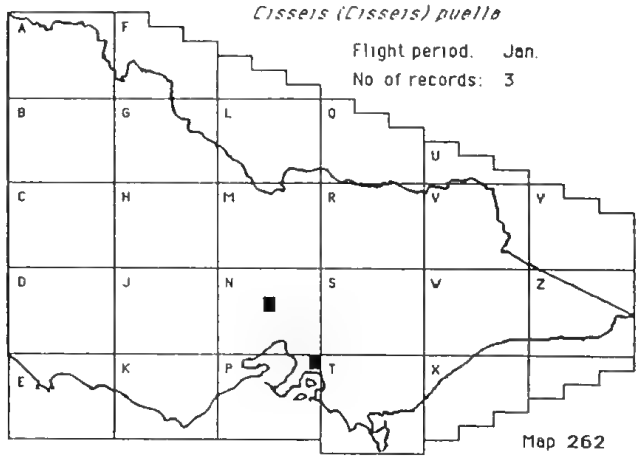
Flight period. Oct & Nov
No of records 7



Map 261

Cissels (Cissels) puella

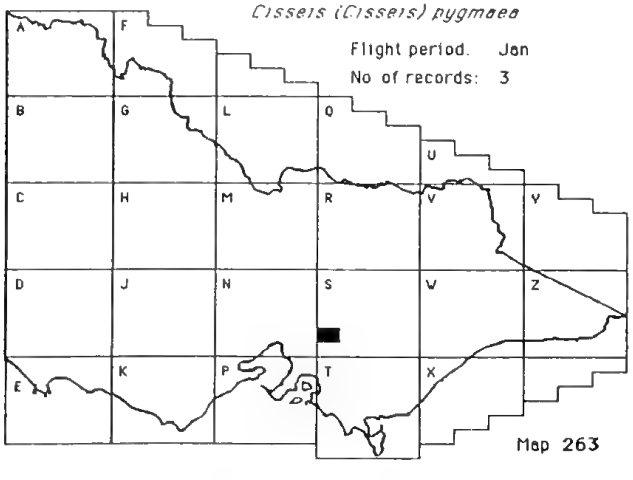
Flight period. Jan.
No of records: 3



Map 262

Cissels (Cissels) pygmaea

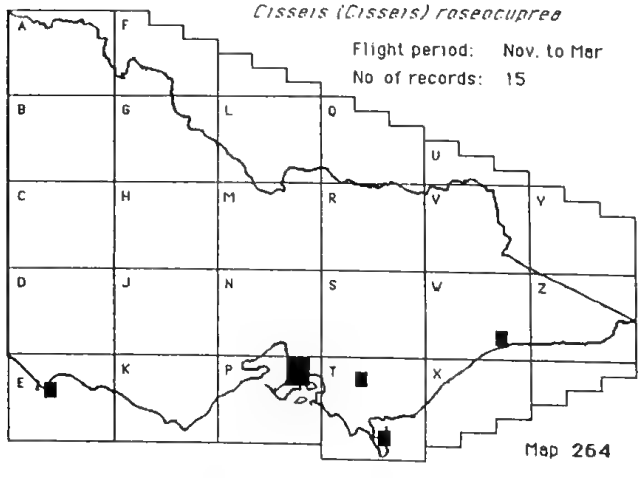
Flight period. Jan
No of records: 3



Map 263

Cissels (Cissels) roseocuprea

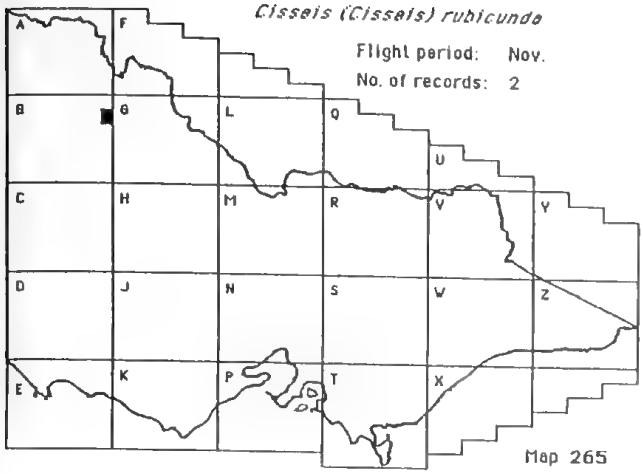
Flight period: Nov. to Mar
No of records: 15



Map 264

Cisseis (Cisseis) rubicunda

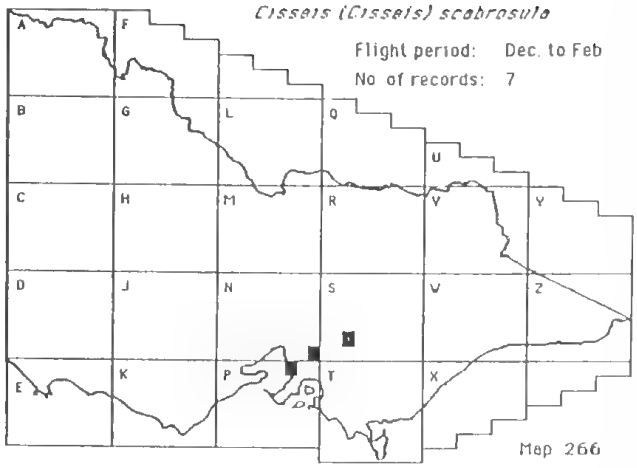
Flight period: Nov.
No. of records: 2



Map 265

Cisseis (Cisseis) scabrosula

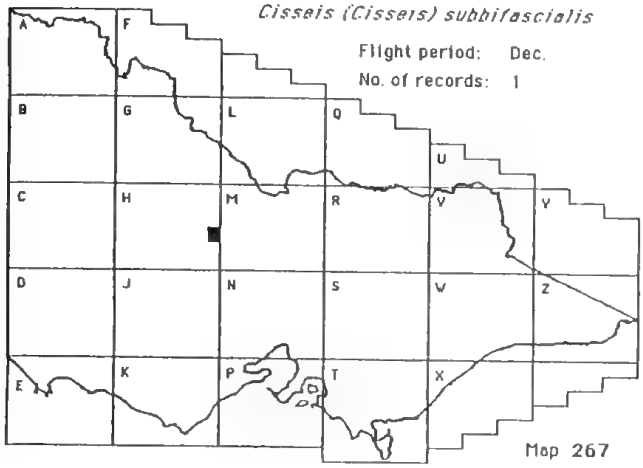
Flight period: Dec. to Feb
No of records: 7



Map 266

Cisseis (Cisseis) subbifascialis

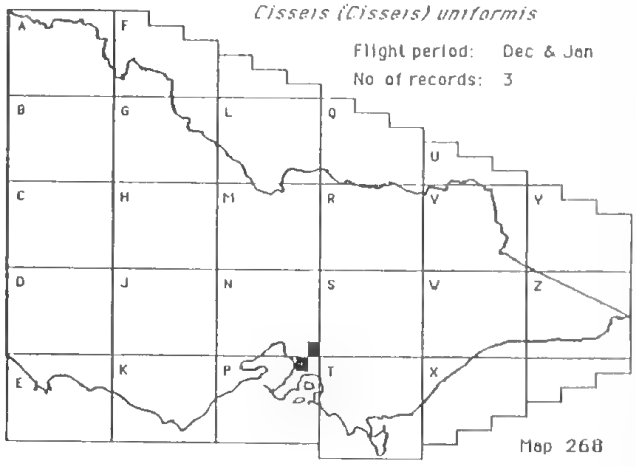
Flight period: Dec.
No. of records: 1



Map 267

Cisseis (Cisseis) uniformis

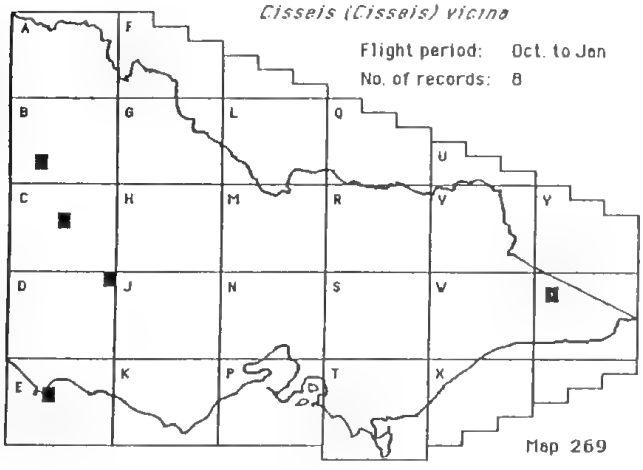
Flight period: Dec & Jan
No of records: 3



Map 268

Cisseis (Cisseis) vicina

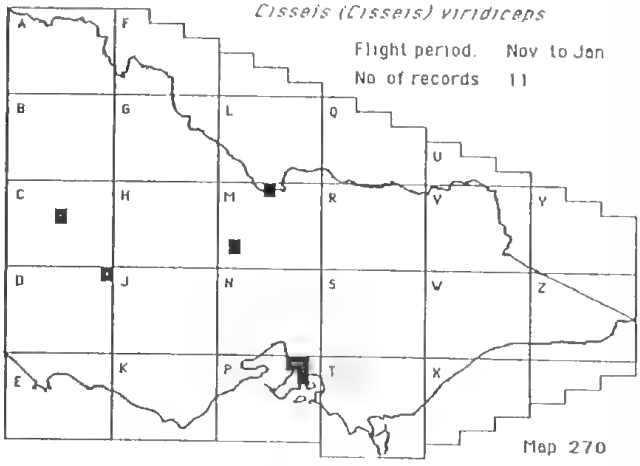
Flight period: Oct. to Jan
No. of records: 8



Map 269

Cisseis (Cisseis) viridiceps

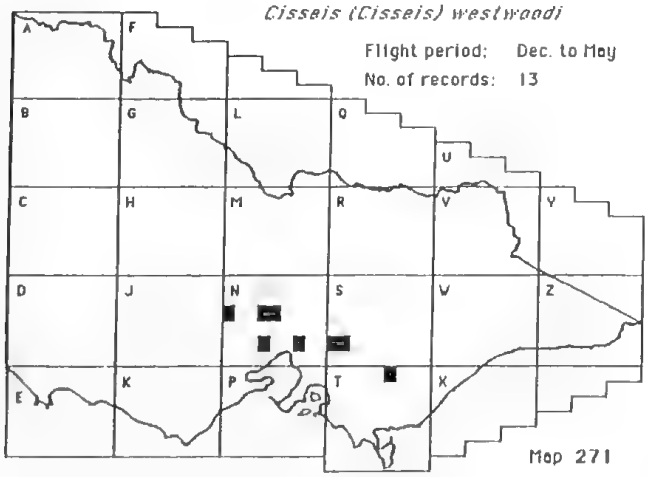
Flight period. Nov to Jan
No of records 11



Map 270

Cisseis (Cisseis) westwoodi

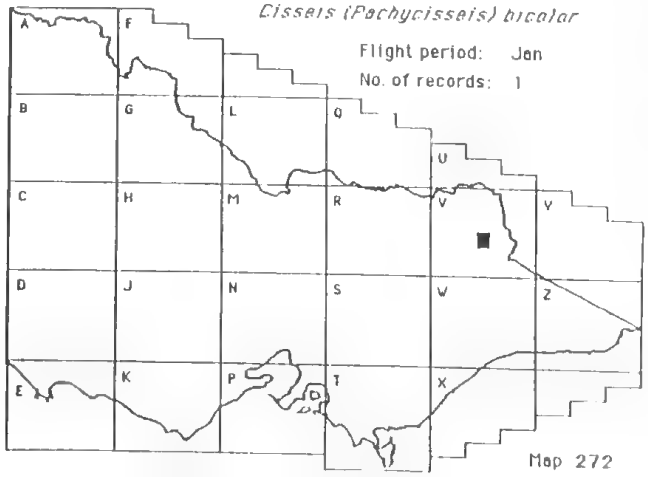
Flight period: Dec. to May
No. of records: 13



Map 271

Cisseis (Pachycisseis) bicolor

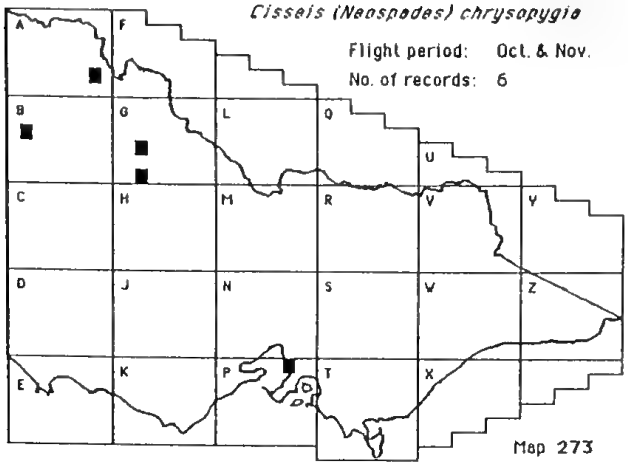
Flight period: Jan
No. of records: 1



Map 272

Cissels (Neospades) chrysopygia

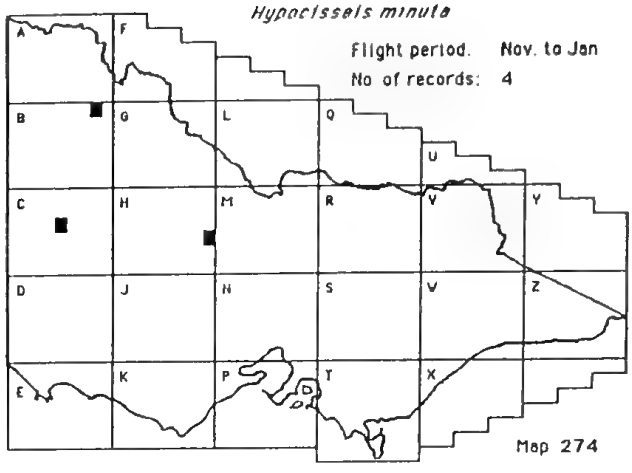
Flight period: Oct. & Nov.
No. of records: 6



Map 273

Hypocisseis minuta

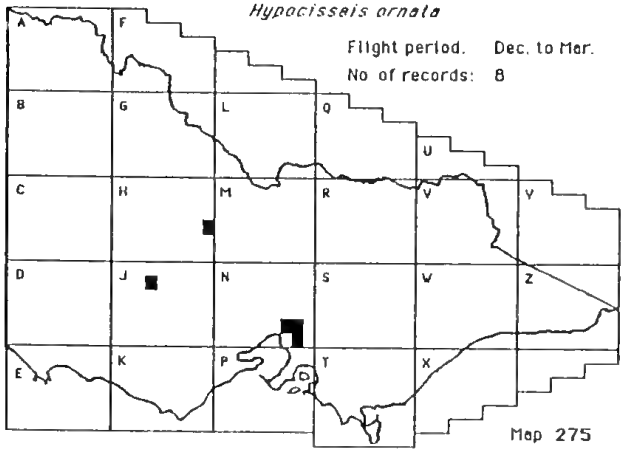
Flight period. Nov. to Jan
No of records: 4



Map 274

Hypocisseis ornata

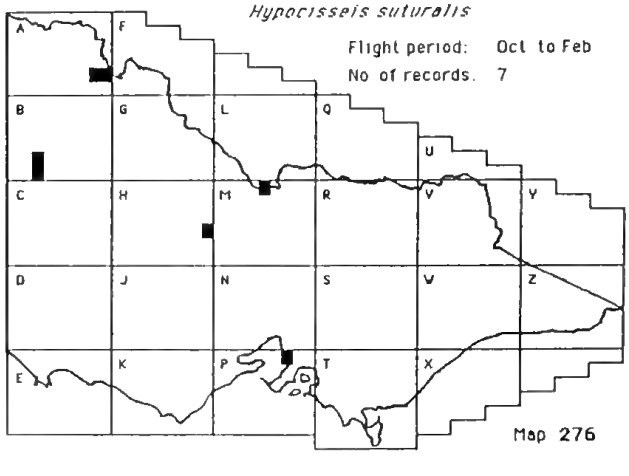
Flight period. Dec. to Mar.
No of records: 8



Map 275

Hypocisseis suturalis

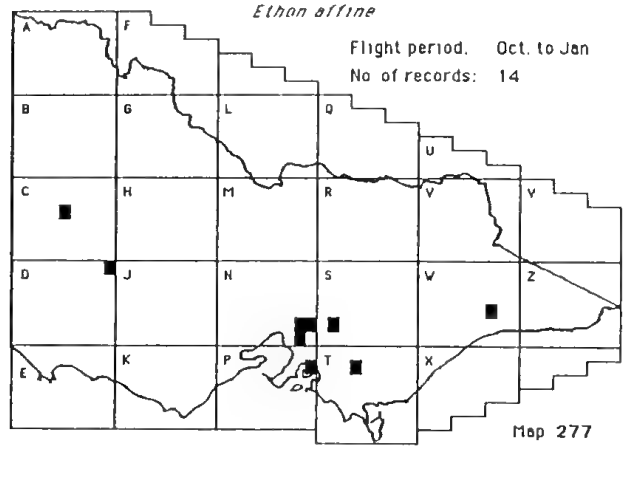
Flight period: Oct to Feb
No of records. 7



Map 276

Ethon affine

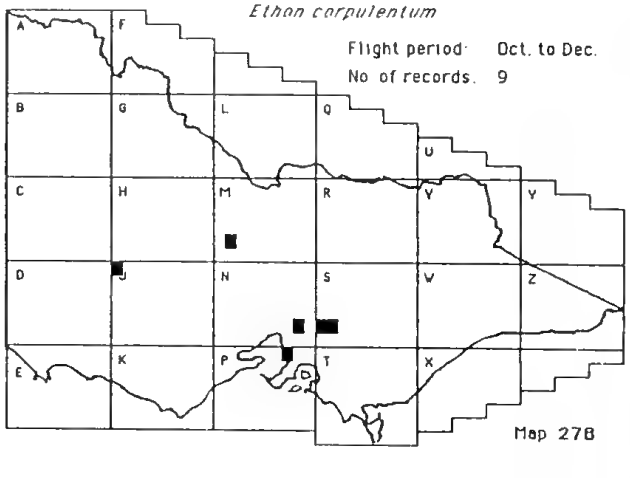
Flight period. Oct. to Jan
No of records: 14



Map 277

Ethon corpulentum

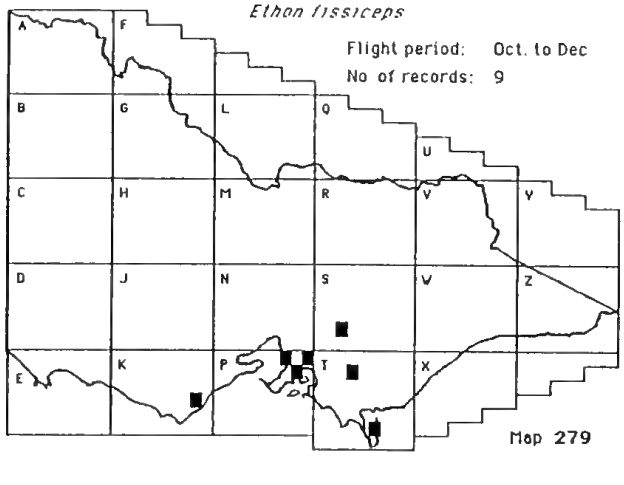
Flight period: Oct. to Dec.
No of records. 9



Map 278

Ethon fissiceps

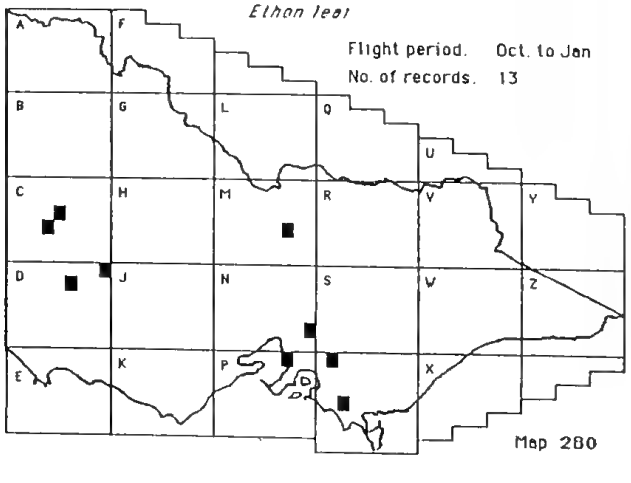
Flight period: Oct. to Dec
No of records: 9



Map 279

Ethon leai

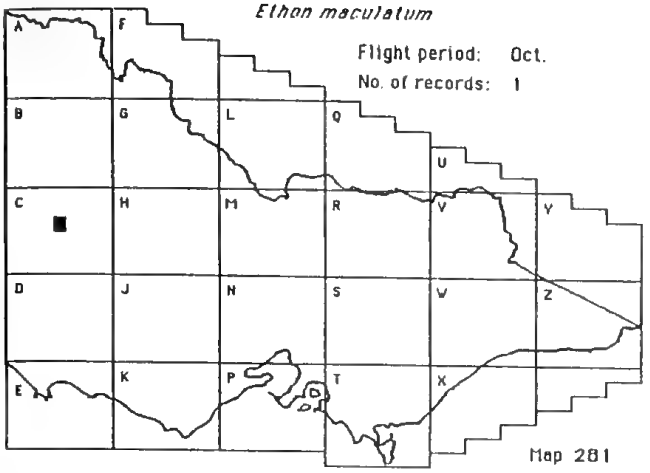
Flight period. Oct. to Jan
No. of records. 13



Map 280

Ethon maculatum

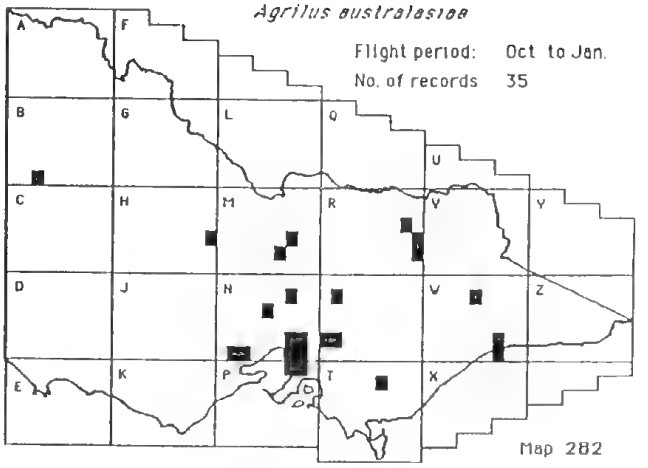
Flight period: Oct.
No. of records: 1



Map 281

Agrilus australasiae

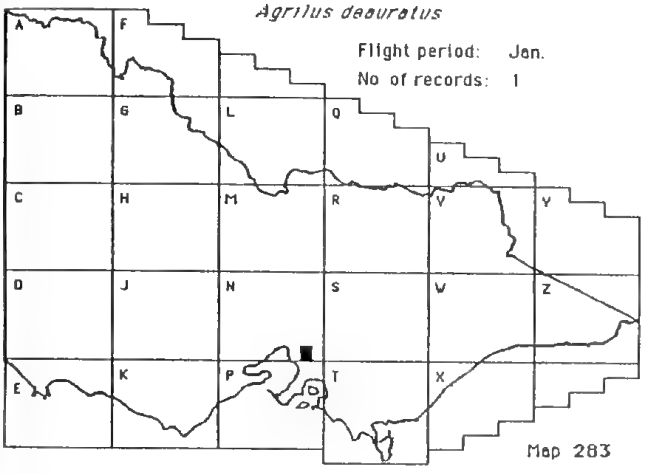
Flight period: Oct to Jan.
No. of records 35



Map 282

Agrilus deauratus

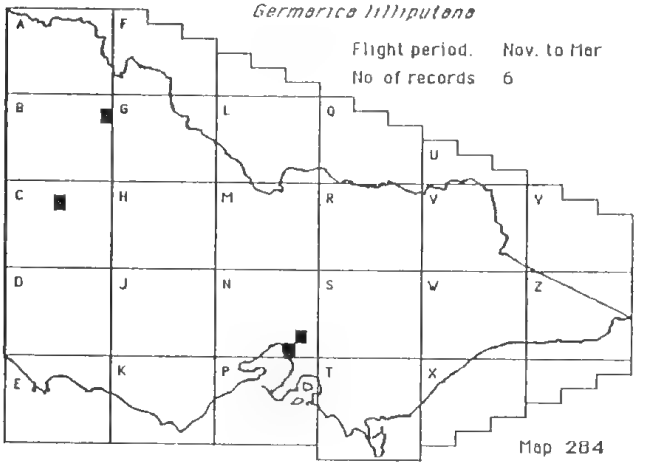
Flight period: Jan.
No of records: 1



Map 283

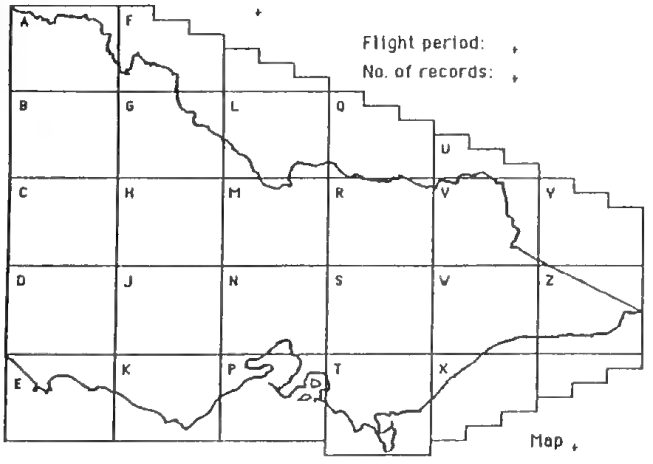
Germarica lilliputana

Flight period. Nov. to Mar
No of records 6



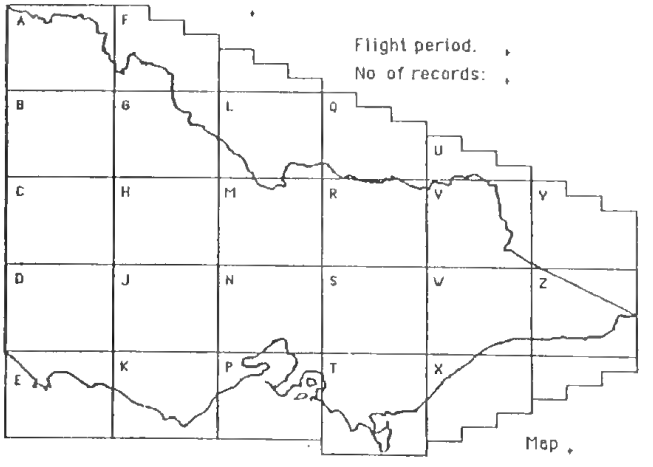
Map 284

Flight period:
No. of records:



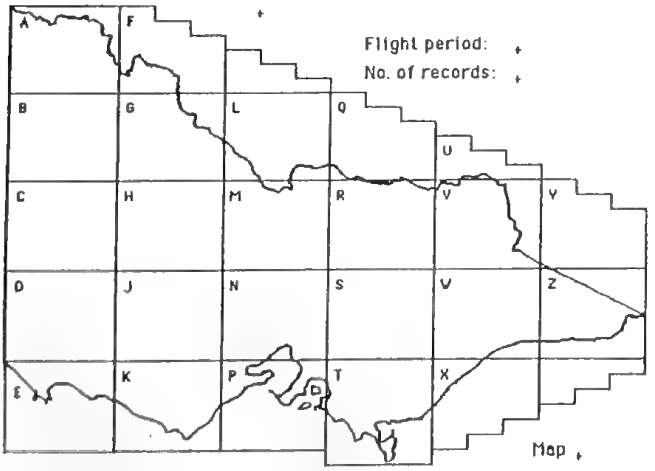
Map

Flight period.
No of records:



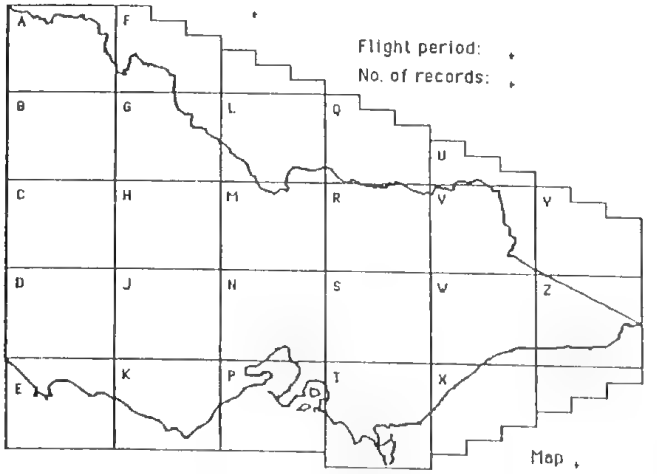
Map

Flight period:
No. of records:



Map

Flight period:
No. of records:



Map

Occasional Papers from the Museum of Victoria 5:55-71 (1992)

The macroinvertebrate assemblages in pools and riffles in two intermittent streams (Werribee and Lerderderg Rivers, southern central Victoria)

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Abstract. Boulton, A.J. and Lake, P.S. 1992. The macroinvertebrate assemblages in pools and riffles in two intermittent streams (Werribee and Lerderderg Rivers, southern central Victoria). *Occasional Papers from the Museum of Victoria* 5: 55–71.

The macroinvertebrate assemblages in pools and riffles at four study sites in the upper reaches of the Werribee and Lerderderg Rivers in central Victoria were sampled from 1982 to 1984 using box and suction samplers and sweep nets. A total of 258 invertebrate taxa was collected in 1175 samples: Mollusca (6 taxa), Crustacea (9), Ephemeroptera (5), Odonata (5), Plecoptera (15), Hemiptera (9), Coleoptera (64), Diptera (89), Trichoptera (29), and 27 other taxa. These taxa and their occurrences in each habitat at each site during each year are listed. Species richness was greater in pools than in riffles in both rivers, probably reflecting the importance of these habitats as refuges when the streams dry. Each taxon was assigned to a functional feeding group based on mouth-part morphology, gut contents, observations in the laboratory, and published dietary studies. Predators were always the most diverse feeding group in all habitats (39% of all aquatic taxa) whereas relatively few taxa were collector-filterers (6%) or collector-shredders (5%). Collector-scrapers and collector-gatherers comprised 19% and 17% respectively, representing most of the individuals, and illustrating the generalized feeding modes of many stream invertebrates.

Introduction

Despite the fact that intermittent and ephemeral streams drain over half of mainland Australia (Williams, 1983), we know very little about the ecology of these streams (Boulton and Suter, 1986). With the growing recognition of the importance of water in arid zones and the fragility of their aquatic systems (e.g., Ponder, 1986), it is crucial that fundamental survey data collected in intermittent streams in Australia are readily available. This need has partly been met for permanent streams in south-eastern Australia, by the publication of distribution lists of aquatic invertebrates (e.g., LaTrobe River, Victoria, Marchant et al., 1984).

It has also been suggested that intermittent streams in arid and semi-arid zones are likely to be highly sensitive harbingers of global climate change (Dahm and Molles, 1990). However, their variability in flow, especially in Australia (Finlayson and McMahon, 1988), means that relatively long-term and intensive studies are required in order to describe fully the resulting variation in community and ecosystem variables. This intensive faunal study of the Werribee and Lerderderg Rivers provides a baseline spanning two years of different flow regimes at four sites for comparison with data collected in the future during studies on long-term climatic change (cf. Gore et al., 1990). Furthermore, understanding the spatial and temporal heterogeneity of lotic systems and the "ecological strategies" used by the biota to persist in these habitats are critical to assessing recovery after anthropogenic disturbances (Poff and Ward, 1990).

This paper presents a complete species list and summarizes distributional data for all aquatic taxa collected from pools and riffles at four sites along the upper reaches of the Werribee and Lerderderg Rivers from 1982 to 1984. Furthermore, each taxon was assigned to a functional feeding group (cf. Cummins and Klug, 1979; Hawkins and Sedell, 1981) because this classification can provide a useful basis for comparisons among studies involving different taxa or dealing with functional variation along river systems (Vannote et al., 1980; Marchant et al., 1985)) or among sites (Bunn, 1986). We do not attempt to analyze statistically these data in this paper; such results were given in Boulton (1988).

Study Area

Full details of the study sites were given by Boulton and Smith (1985) and Boulton and Lake (1990). Briefly, two study sites (upstream of the Werribee Picnic Spot (WPS), and Spargo Creek (SC)) were located on the upper reaches of the Werribee River, and two (Fireplace Ford (FF), and Wheeler Road (WR)) on the Lerderderg River. These rivers rise on the southern edge of the Great Dividing Range some 100 km NW of Melbourne, join near Bacchus Marsh and flow south-east to empty into Port Phillip Bay (Fig. 1 in Boulton and Lake, 1990). An annual average rainfall of 950 mm (Smith, 1976) falls on the catchment which is vegetated

by dry sclerophyll forest dominated by Manna Gum (*Eucalyptus viminalis* Labillard). Annual discharge reflects rainfall, peaking in spring, and ceasing in summer almost annually at the Werribee River sites and one year in three at the Lerderderg sites. Mean daily discharge is 24.2 Ml in the Werribee and 27.3 Ml in the Lerderderg River (Australian Water Resources Council, 1979) and highly variable (coefficient of variation of annual flow is 77% and 62% respectively (McMahon, 1979)).

The study commenced in a drought year, 1982. The Werribee River did not flow at all at the upstream site (SC) and only flowed for 5 months (late June to late November) at WPS. The study pool at WPS dried during the ensuing summer. In 1983, flow began in late May and continued for 7.5 months at both sites. At FF and WR, the Lerderderg began to flow in late May, 1982 and ceased in December. At WR, the study pool dried for six weeks that summer whereas at FF it shrank to a moist patch of leaves before refilling in mid-March. Flow resumed in May, 1983 and continued beyond the end of the study in March, 1984.

Methods

Sampling

Physicochemical data were collected each trip, and were discussed elsewhere (Boulton, 1988; Boulton and Lake, 1990). In 1982-1983, five 30-second sweep-net samples were taken in the pools using an FBA pond net (300 µm mesh). While shuffling vigorously along the bottom of the pool, the pond net was swept from side to side across the disturbed path. When necessary, large wood fragments and cobbles retained in the net were thoroughly rinsed to remove clinging invertebrates before being discarded. Net contents were fixed in 5% formalin.

In adjacent riffles, five samples were collected using a Portable Invertebrate Sampler resembling that illustrated by Merritt and Cummins (1984). This device is a galvanized-iron box whose lower edges are lined with sponge rubber to ensure a seal with the uneven substratum. The upstream face of the box is removable, allowing water currents to flush the box contents into a collecting net (50 µm mesh) attached to the downstream face. The sampler encloses 0.05 m^2, exceeding the diameter of most rocks at the sites. The sampling plot was located using random numbers as co-ordinates, the sampler was placed carefully, and the box's contents agitated and scrubbed to a depth of 10 cm while the current washed suspended material and invertebrates into the collecting net. Samples were fixed in 5% formalin.

Often the current was insufficient to flush the box's contents into the collecting net or the water level was too low (< 5 cm) to flow into the box. This meant that the contents had to be manually scooped into the net - an inconsistent and unsatisfactory sampling method remedied by the development of a flow-independent pump sampler described by Boulton (1985). This device was used in 1983-1984 to collect four samples each from pool and riffle habitats at each site except SC where the pool was too deep (> 100 cm) for the sampler. A pilot study based on 40 samples (Boulton, 1988) confirmed that four samples sufficed to provide estimates of the abundances of the 15 most common taxa to within 40% of their means (cf. Elliott, 1977). For comparisons with pool samples collected during 1982, three sweep net samples were taken in each pool during 1983–1984. Fewer samples were collected when pools were smaller than normal (filling or drying) to avoid biases due to habitat disruption or artificial predation. During floods in September, 1983, pump samples could not be taken, necessitating four "kick samples" (Frost et al., 1971) instead.

In 1982, samples were taken approximately monthly (Table 1). As some taxa (e.g., Simuliidae, Chironomidae) can complete their aquatic stages in less than a month at high water temperatures (Chutter, 1968; Oliver, 1971), sampling frequency was increased to fortnightly in 1983-1984 (Table 1) to avoid missing these taxa. Taxonomy of larval Trichoptera and nymphal Ephemeroptera and Plecoptera was aided by the collection of adult material from light traps and by regular sweep-netting over riparian vegetation.

Laboratory processing

Preserved samples were washed through a nest of sieves with mesh sizes of 2 mm, 1 mm, and 300 µm. Taxa retained by the two larger meshes were hand-sorted under 12× magnification. Organisms retained by the 300 µm mesh were separated from accompanying organic detritus using the kerosene-ethanol phase technique of Barmuta (1984). Macroinvertebrates were counted and identified as far as practicable using available keys and the voucher collection of the Museum of Victoria; most of the identifications were confirmed or carried out by a variety of experts (see Acknowledgements). Adults and larvae of some taxa (e.g., Elmidae, Hydrophilidae) were treated as separate entities because we were uncertain whether they were conspecific and in many cases they occupied different functional feeding groups.

Each taxon was assigned to a functional feeding group (*sensu* Cummins, 1975; Cummins and Klug, 1979) according to mouth-part morphology and feeding behaviour observed in the laboratory or reported in the literature. Additional information on dietary habits was provided by teasing out the foregut contents of at least 20 specimens of the more common species into polyvinyl lactophenol and comparing them with reference mounts of macerated wood, coarse particulate organic matter (CPOM), fine POM, periphyton, and fine inorganic material. No attempt was made to quantify dietary items (cf. Chessman, 1986). Animals using more than one mode of food collection (e.g., collector-shredder) were treated as separate functional groups because we deemed it unrealistic simply to divide the combination equally between constituent feeding modes (cf. Hawkins and Sedell, 1981). Several taxa were too rare to be unequivocally classified.

Results

A total of 258 taxa was collected from pools and riffles at the four study sites in 1982–1984 (Table 2). Almost a quarter of these were Coleoptera while Diptera comprised just over a third of the total number of taxa (Table 3). Other species-rich groups included aquatic arachnids, Plecoptera, and Trichoptera. Four species of Anura (*Litoria ewingi* (Dumeril and Bibron): Hylidae; *Geocrinia victoriana* (Boulenger), *Neobatrachus sudelli* (Lamb), *Ranidella signifera* (Girard): Myobatrachidae) and two teleost fish (*Galaxias olidus* Günther: Galaxiidae and *Edelia ?obscura* (Klunzinger): Kuhliidae) were also recorded.

Most of the species were predators (Table 4). Collector-scrapers and collector-gatherers were also relatively diverse whereas few taxa were collector-filterers and collector-shredders (Table 4). Most of the individuals (chironomids, oligochaetes, mayfly and stonefly nymphs) collected during this study were collector-gatherers and collector-scrapers.

Discussion

The large number of species of aquatic macroinvertebrates in these intermittent streams has been discussed elsewhere (Boulton and Suter, 1986; Boulton and Lake, 1988) and more recent studies in arid-zone streams in central Australia (Davis et al., in press) suggest that this phenomenon is widespread. The considerable habitat diversity offered by intermittent streams, coupled with the adaptations of many species (e.g., Towns, 1985; Boulton and Lake, 1988) to cope with a long history of aridity is probably responsible for such high species richness in these systems (Lake et al., 1986).

The higher species diversity found in pools (when equivalent numbers of samples were collected using a flow-independent sampling device) differs from the patterns observed in a review of 17 upland permanent streams in North America and the United Kingdom where numbers of taxa were similar between pools and riffles (Logan and Brooker, 1983). The greater species richness probably reflects the importance of pools in the Werribee and Lerderderg Rivers as over-summering refuges (Boulton, 1989).

Many of the species found in late summer are able to tolerate low dissolved oxygen levels or are air-breathing, and most are mobile (e.g., adult dytiscids) and able to escape when the pools dry. Relatively few taxa appear to be obligate inhabitants of intermittent streams; the majority are opportunistic generalists that also occur in nearby permanent streams (Boulton, 1988) or lentic waterbodies (e.g., Hemiptera, Coleoptera).

There are practical difficulties associated with assigning stream invertebrates to functional feeding groups because many of the animals appear to be opportunistic generalists that feed on a wide range of food resources. Diets also tend to change with age. For example, the stonefly *Illiesoperla australis* is a collector-gatherer in its early stages, switching to predation just before its final instars (Yule, 1990). Many taxa possess relatively undifferentiated mouth-parts, richly endowed with brushes and setae that confound attempts to classify them readily into feeding groups. Therefore, generalizations must be cautiously considered.

The high diversity of predators reflects the rich fauna of water mites, dytiscids, hemipterans, odonates, tanypods and other dipterans recorded in this study. The high species richness of predators in receding temporary waters has been reported elsewhere in Australia (Lake et al., 1989) and world-wide (Williams, 1987); densities tend to rise as pools dry up and prey become concentrated (Boulton, 1988; Lake et al., 1989). Most of the individuals collected from the Werribee and Lerderderg Rivers were collector-gatherers and collector-scrapers although these groups were only moderately diverse. This undoubtedly reflects the generalist feeding strategies discussed above, and reiterates the opportunistic nature of many of the lotic macroinvertebrates in these two intermittent streams.

Acknowledgements

Many people helped pump samples in the field; we especially thank Ros "Killer" St Clair. Other members of the Stream Group who helped us and discussed this research include Leon Barmuta, Sabine Schreiber, Nick O'Connor, Anthony Sokol, and Timothy Tams. Field equipment and avuncular guidance came from Darvyd Mortein.

We are especially grateful for the swift and careful taxonomic assistance graciously given by M.S. Harvey (Hydracarina), C.H.S. Watts (Dytiscidae), T. Weir (Elmidae), J.A. Davis (Psephenidae), J.F. Lawrence (other Coleoptera), G. Theischinger and C. Yule (Plecoptera), P.J. Suter (Ephemeroptera), D. Cartwright and J. Dean (Ephemeroptera, free-living larval Trichoptera), A. Neboiss (adult Trichoptera), A. Wells (Hydroptilidae), R. St Clair (Platyhelminthes, Leptoceridae, some Chironomidae), L. Metzeling (Tipulidae), B. Knott (Phreatoicidae), W.D. Williams (Amphipoda), P. Horwitz (Parastacidae), I. Lansbury (Hemiptera), J. Prince (Simuliidae), W. Ponder and B. Smith (Gastropoda), and A. Sokol (Anura). Richard Marchant, Peter Lillywhite, and Leon Metzeling kindly provided access to the voucher collection and laboratory facilities at the Museum of Victoria, and parted with chips and much practical and taxonomic advice on aquatic Diptera (especially the Nosebottidae).

Richard Marchant suggested this contribution, and we thank him for his critical comments on an earlier draft which was typed by Y.S. Lawson and Lorna Lucas, Zoology Department, University of Adelaide.

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Table 1. Dates of sampling trips to the study sites during 1982-1984.

Month	1982	1983	1984
January		20	4, 18, 31
February		8	14, 25
March		8, 21, 29	23
April		5, 19, 30	
May	25	10, 24	
June	2-3, 27	7, 22	
July	8, 23	5, 19	
August	22	2, 16, 30	
September	13, 23-24	13, 27	
October	26	11, 25	
November	25	8, 24	
December	19, 23	7, 20	

Table 2. Aquatic macroinvertebrate taxa collected in pools (P) and riffles (R) at the four study sites on the Werribee and Lerderderg Rivers in 1982 ('82) and 1983-84 ('83). The collecting technique (SW = FBA kick-sweep sample, PS = pump sample, BS = box sample) and number of samples are listed below site (SC = Spargo Creek, WPS = Werribee River Picnic Spot, FF = Fireplace Ford, WR = Wheeler Road). Functional feeding groups abbreviated as follows: Cf = Collector-filterers, Cscr = Collector-scrapers, Cg = Collector-gatherers, Cshr = Collector-shredders, Pred = Predators (includes 'piercing' and 'engulfing' predators), Scr = Scrapers, Shr = Shredders, Gen = Generalist feeders, Nf = Nonfeeding stages, Un = Uncertain diet. NMV refers to the National Museum of Victoria voucher number.

Taxa	Functional Feeding Group	Werribee River							Lerderderg River									
		SC		WPS					FF					WR				
		'83 SW 54 P	'83 PS 75 R	'82 SW 58 P	'83 SW 74 P	'83 PS 89 P	'82 BS 28 R	'83 PS 88 R	'82 SW 58 P	'83 SW 75 P	'83 PS 92 P	'82 BS 36 R	'83 PS 92 R	'82 SW 58 P	'83 SW 77 P	'83 PS 93 P	'82 BS 36 R	'83 PS 92 R
HYDROZOA																		
Hydridae																		
Hydra ?oligactis Pallas	Pred	x		x	x	x		x	x	x	x	x	x	x	x	x	x	x
Hydra (Chlorohydra) ?viridissima Pallas	Pred			x	x	x			x	x	x			x	x	x		x
TURBELLARIA																		
Temnocephalida																		
Temnocephala sp.	Un			x	x	x												
Neorhabdocoela																		
?Mesostoma sp.	Pred	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Tricladida																		
Cura pinguis (Weiss)	Pred	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
NEMATODA	Gen	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
NEMATOMORPHA																		
Gordiidae																		
Gordius sp.	Nf								x			x						
GASTROPODA																		
Hydrobiidae																		
Angrobia sp. nov. (Dr W. Ponder, pers. comm.)	Scr				x	x	x	x	x	x	x	x	x	x	x	x	x	x
Glacidorbis hedleyi Iredale	Pred	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Ancylidae																		
Ferrissia (Pettancylus) spp. (includes *F. petterdi* (Johnston) and *F. tasmanica* (Tenison-Woods))	Scr			x	x	x		x	x	x	x	x	x	x	x	x	x	x
Planorbidae																		
Physastra gibbosa (Gould)	Scr	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Table 2 (continued)

Taxa	Functional Feeding Group	Werribee River							Lerderderg River									
		SC		WPS					FF					WR				
		'83 SW 54 P	'83 PS 75 R	'82 SW 58 P	'83 SW 74 P	'83 PS 89 P	'82 BS 28 R	'83 PS 88 R	'82 SW 58 P	'83 SW 75 P	'83 PS 92 P	'82 BS 36 R	'83 PS 92 R	'82 SW 58 P	'83 SW 77 P	'83 PS 93 P	'82 BS 36 R	'83 PS 92 R
BIVALVIA																		
Sphaeriidae																		
Sphaerium (Musculium) tasmanicum (Tenison-Woods)	Cf			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
OLIGOCHAETA (includes Tubificidae, Lumbriculidae, Enchytraeidae, Naididae, Phreodrilidae, Haplotaxidae)	Cg	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
CRUSTACEA																		
Syncarida																		
Koonungidae																		
Koonunga sp.	Cg							x										
Isopoda																		
Janiridae																		
Heterias sp.	Cg		x	x	x	x		x										
Phreatoicidae																		
Crenoicus mixtus Nicholls	Cshr			x	x	x	x	x			x	x		x	x	x	x	x
Amphipoda																		
Ceinidae																		
Afsrochiltonia australis (Sayce)	Cshr		x	x	x	x	x	x			x			x		x		
Gammaridae																		
'Niphargus' sp.	Cshr		x		x					x	x		x					
Blind gammarid sp.	Cshr	x	x	x	x				x	x		x		x	x	x		
Decapoda																		
Atyidae																		
Paratya australiensis Kemp	Cshr			x	x													
Parastacidae																		
Cherax destructor Clark	Shr			x	x	x	x											
Engaeus setimerus Horwitz	Shr	x		x	x	x												
ARACHNIDA																		
Hydracarina																		
Eylaidae																		
Eylais sp.	Pred											x						
Hydryphantidae																		
Tartarothyas boultoni Harvey	Pred	x			x	x	x	x			x				x			
Diplodontus sp.	Pred			x														
Limnesiidae																		
Limnesia spp.	Pred	x		x	x	x	x	x	x	x	x	x	x	x	x	x		x
Interstitial *Limnesia* sp.	Pred								x									

Table 2 (continued)

Taxa	Functional Feeding Group	Werribee River SC '83 SW 54 P	Werribee River SC '83 PS 75 R	Werribee River WPS '82 SW 58 P	Werribee River WPS '83 SW 74 P	Werribee River WPS '83 PS 89 P	Werribee River WPS '82 BS 28 R	Werribee River WPS '83 PS 88 R	Lerderderg River FF '82 SW 58 P	Lerderderg River FF '83 SW 75 P	Lerderderg River FF '83 PS 92 P	Lerderderg River FF '82 BS 36 R	Lerderderg River FF '83 PS 92 R	Lerderderg River WR '82 SW 58 P	Lerderderg River WR '83 SW 77 P	Lerderderg River WR '83 PS 93 P	Lerderderg River WR '82 BS 36 R	Lerderderg River WR '83 PS 92 R
Hygrobatidae																		
Hygrobates sp.	Pred	x	x	x	x	x	x	x		x	x	x	x		x	x	x	x
Australiobates spp.	Pred	x	x	x	x	x	x	x	x	x	x		x	x	x	x		x
Corticacarus spp.	Pred	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Aspidiobates sp.	Pred	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Gondwanabates sp.	Pred																x	
Pionidae																		
Piona ?uncatiformis Lundblad	Pred			x	x		x		x									
Aturidae																		
Frontipodopsis sp.	Pred											x	x					
'Notoaturus' sp.	Pred	x	x		x	x		x	x	x	x	x	x	x		x	x	x
Arrenuridae																		
Arrenurus sp.	Pred	x			x	x	x											
Mesostigmata																		
Aquatic species 1	Pred				x	x	x			x						x		
Aquatic species 2	Pred	x			x	x	x	x		x	x		x			x		x
Aquatic species 3	Pred				x	x									x	x		
INSECTA																		
Ephemeroptera																		
Baetidae																		
Pseudocloeon sp.	Cscr	x	x		x	x		x					x		x	x		x
Leptophlebiidae																		
Atalophlebia sp. (nr *albiterminata/tuhla/ hudsoni*[1])	Cscr	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
Nousia spp. (*N.* nr *inconspicua* - Werribee R., *N.* nr *fuscula* - Lerderderg R.[1])	Cscr	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Jappa sp.	Cscr									x	x				x	x		
Odonata																		
Zygoptera																		
Lestidae																		
Austrolestes ?io (Selys)	Pred	x		x	x	x	x	x								x		
Amphipterygidae																		
Diphlebia sp.	Pred			x							x				x			
Anisoptera																		
Aeschnidae																		
Austroaeschna ?parvistigmata Martin	Pred									x		x						

Table 2 (continued)

Taxa	Functional Feeding Group	Werribee River							Lerderderg River									
		SC		WPS					FF					WR				
		'83 SW 54 P	'83 PS 75 R	'82 SW 58 P	'83 SW 74 P	'83 PS 89 P	'82 BS 28 R	'83 PS 88 R	'82 SW 58 P	'83 SW 75 P	'83 PS 92 P	'82 BS 36 R	'83 PS 92 R	'82 SW 58 P	'83 SW 77 P	'83 PS 93 P	'82 BS 36 R	'83 PS 92 R
Synthemidae																		
Synthemis sp.	Pred	x			x	x		x		x	x					x		
Corduliidae																		
Hemicordulia ?tau Selys	Pred			x	x	x												
Plecoptera																		
Austroperlidae																		
Austropentura victoria Illies	Cshr								x	x	x	x	x	x	x	x	x	x
Acruroperla atra (Samal)	Shr								x	x	x		x		x	x	x	x
Notonemouridae																		
Austrocerca tasmanica (Tillyard)	Cshr	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Gripopterygidae																		
Illiesoperla australis (Tillyard)[2]	Cg	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Newmanoperla thoreyi McLellan	Cscr	x	x															
Leptoperla bifida McLellan	Cscr	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Leptoperla sp.	Cscr	x	x		x	x		x		x	x				x	x		
Riekoperla rugosa (Kimmins)	Cscr	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
R. tuberculata McLellan	Cscr					x		x			x	x	x		x		x	x
R. karki-reticulata group[3]	Cscr	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Trinotoperla montana (Riek)[4]	Scr				x	x		x	x	x	x	x	x		x	x	x	x
Dinotoperla fontana Kimmins	Cscr	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
D. thwaitesi Kimmins	Cscr	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
D. eucumbene McLellan	Cshr										x	x	x					
D. brevipennis Kimmins	Cscr	x	x		x		x	x		x	x	x	x	x		x	x	x
Heteroptera																		
Gerridae																		
Rheumatometra philarete Kirkaldy	Pred													x				
Veliidae																		
Microvelia dubia Hale	Pred	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
M. distincta Malipatil	Pred	x		x	x	x	x		x	x				x	x			
Notonectidae																		
Enithares woodwardi Lansbury	Pred	x		x					x	x								
Anisops deanei Brooks	Pred	x		x	x				x	x				x	x			
A. ?hackeri Brooks	Pred			x	x									x	x			
Corixidae																		
Micronecta annae illiesi Wróblewski	Cg	x	x	x	x	x			x	x	x			x	x	x		x
M. a. tasmanica Wróblewski	Cg				x	x			x						x	x		

Table 2 (continued)

Taxa	Functional Feeding Group	Werribee River SC '83 SW 54 P	SC '83 PS 75 R	WPS '82 SW 58 P	WPS '83 SW 74 P	WPS '83 PS 89 P	WPS '82 BS 28 R	WPS '83 PS 88 R	FF '82 SW 58 P	FF '83 SW 75 P	FF '83 PS 92 P	FF '82 BS 36 R	FF '83 PS 92 R	Lerderderg River WR '82 SW 58 P	WR '83 SW 77 P	WR '83 PS 93 P	WR '82 BS 36 R	WR '83 PS 92 R
Sigara (Tropocorixa) truncatipala (Hale)	Cg	x		x	x	x			x	x				x	x			
Megaloptera																		
Corydalidae																		
Protochauliodes sp.	Pred													x				
Coleoptera[5]																		
Noteridae																		
Unidentified larvae (Watts, pers. comm., 4.2.85)	Pred									x								
Dytiscidae																		
Antiporus blakei (Clark)	Pred	x		x	x	x	x		x	x	x		x	x		x		
A. femoralis (Boheman)	Pred	x		x	x	x			x	x	x			x	x	x		
Antiporus spp. larvae	Pred	x		x	x	x	x		x	x	x				x	x		
Australphilus saltus Watts	Pred				x				x	x				x	x			
Australphilus sp. larvae	Pred				x	x		x		x				x	x	x		x
Chostonectes gigas (Boheman)	Pred								x					x	x			
C. johnsoni (Clark)	Pred	x		x	x	x	x		x	x	x	x		x	x	x		
Chostonectes spp. larvae	Pred	x	x	x	x	x	x	x	x	x	x		x		x	x	x	x
Copelatus australiae Clark	Pred	x	x		x		x							x				
Copelatus sp. larvae	Pred	x			x										x			
?*Hydaticus* sp. larvae	Pred														x	x		
Hyderodes schuckardi Hope	Pred	x				x												
Lancetes lanceolatus (Clark)	Pred	x	x	x	x			x	x		x			x	x	x		
Lancetes sp. larvae	Pred	x	x		x	x	x	x		x	x				x	x	x	x
Liodessus schuckardi (Clark)	Pred	x		x	x	x	x	x	x	x	x		x	x	x	x	x	x
Megaporus hamatus (Clark)	Pred	x			x	x												
Necterosoma penicillatum (Clark)	Pred	x		x	x	x	x	x	x	x	x			x	x	x	x	x
Necterosoma sp. larvae	Pred	x	x	x	x	x	x	x	x	x	x		x	x	x	x		
Platynectes decempunctatus (Fabricius)	Pred	x	x	x	x	x									x			x
Platynectes sp. larvae	Pred	x	x		x											x		
Rhantus suturalis (Macleay)	Pred	x		x		x			x	x	x			x	x	x		
Sternopriscus hansardi (Clark)	Pred	x		x														
S. multimaculatus (Clark)	Pred									x								
S. mundanus Watts	Pred	x		x	x	x	x		x	x	x	x		x	x	x	x	x
Sternopriscus sp.	Pred															x		
?*Eretes* sp. larvae	Pred				x	x												
?*Rhantus* sp. larvae	Pred	x		x	x	x									x	x		
Gyrinidae															x			
Aulonogyrus strigosus Guérin	Pred									x								
Macrogyrus sp.	Pred													x	x			

Table 2 (continued)

Taxa	Functional Feeding Group	Werribee River							Lerderderg River									
		SC		WPS					FF					WR				
		'83 SW 54 P	'83 PS 75 R	'82 SW 58 P	'83 SW 74 P	'83 PS 89 P	'82 BS 28 R	'83 PS 88 R	'82 SW 58 P	'83 SW 75 P	'83 PS 92 P	'82 BS 36 R	'83 PS 92 R	'82 SW 58 P	'83 SW 77 P	'83 PS 93 P	'82 BS 36 R	'83 PS 92 R
Gyrinidae sp. larvae	Pred														x	x		
Hydraenidae																		
Hydraena ?ambiflagellata Zwick	Cscr		x			x	x								x	x		
H. luridipennis Macleay	Cscr	x			x	x	x		x	x	x			x	x	x		x
H. ?tricantha Zwick	Cscr	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Hydraena sp.	Cscr		x		x	x							x			x		x
Ochthebius sp. 1	Cscr			x														
Ochthebius sp. 2	Cscr	x			x				x						x		x	
Ochthebius sp. 3	Cscr	x			x	x		x			x		x				x	
Hydrochidae																		
Hydrochus sp. 1	Cscr				x					x								
Hydrochus sp. 2	Cscr		x											x				
Hydrophilidae																		
Berosus sp.	Cscr	x			x						x		x					
Berosus sp. larvae	Pred				x						x							
Enochrus sp.	Cscr				x									x				
Helochares australis Blackburn	Cscr	x			x					x					x			
Limnoxenus zeelandicus (Broun)	Cscr		x		x				x				x					
Paracymus pygmaeus (Macleay)	Cg	x	x	x	x	x		x	x	x	x	x		x	x	x	x	
Paracymus sp. larvae	Pred	x		x	x	x				x	x	x	x		x		x	
Paranacaena lindi Blackburn	Cg	x	x	x	x								x	x	x			
Helodidae																		
Helodid sp. 1 larvae	Cg													x		x		
Helodid sp. 2 larvae	Cg	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x
Helodid sp. 3 larvae	Cg									x	x			x	x	x		x
Helodid sp. 4 larvae	Cg											x			x			
Helodid sp. 5 larvae	Cg				x		x											
?Limnichidae sp.	Cg		x											x				
Psephenidae																		
Sclerocyphon striatus Lea larvae	Scr				x	x	x	x	x	x	x	x	x	x		x	x	x
Ptilodactylidae sp. larvae	Shr								x	x	x	x	x		x	x	x	x
Elmidae																		
Austrolimnius (Tiphonaetes) hebrus (Hinton)	Scr		x					x	x	x	x	x	x			x	x	x
A. (Limnelmis) maro Hinton	Scr							x		x	x	x	x	x	x	x	x	x
A. (L.) miletus Hinton	Scr										x	x	x			x	x	x
A. "mormo" larvae	Scr	x			x			x	x	x	x	x	x				x	x
Austrolimnius sp. larvae	Scr								x	x	x	x	x			x	x	x

Table 2 (continued)

Taxa	Functional Feeding Group	Werribee River							Lerderderg River									
		SC		WPS					FF					WR				
		'83 SW 54 P	'83 PS 75 R	'82 SW 58 P	'83 SW 74 P	'83 PS 89 P	'82 BS 28 R	'83 PS 88 R	'82 SW 58 P	'83 SW 75 P	'83 PS 92 P	'82 BS 36 R	'83 PS 92 R	'82 SW 58 P	'83 SW 77 P	'83 PS 93 P	'82 BS 36 R	'83 PS 92 R
Notriolus quadriplagiatus Carter	Cscr		x	x	x	x	x	x			x	x	x					
N. quadriplagiatus larvae	Cscr			x	x	x		x										
Simsonia tasmanica (Blackburn)	Cscr								x	x	x	x	x					
S. tasmanica larvae	Cscr								x	x	x	x	x				x	
Kingolus sp. larvae (NMV sp. I)	Cscr								x							x		
Mecoptera																		
Nannochoristidae																		
Nannochorista sp.	Pred											x						
Diptera																		
Tipulidae																		
Cryptolabis sp. (nr NMV sp. 4)	Cg													x	x	x		x
Ctenophora sp.	Shr	x	x								x						x	
Dactylolabis sp.	Pred										x		x					
Hexatoma nr *megacera* (nr NMV sp. 39)	Pred		x	x	x	x		x										
Hexatoma sp. 1 (nr NMV sp. 24)	Pred			x	x									x	x	x		
Hexatoma sp. 2 (nr NMV sp. 45)	Pred		x										x					
Limnophila sp. 1 (nr NMV sp. 1)	Pred									x					x			
Limnophila sp. 2	Pred		x	x	x	x	x		x	x	x	x		x		x	x	x
Limonia sp. 1 (NMV sp. 3)	Cg		x		x			x		x			x		x	x		x
Limonia sp. 2	Cg			x			x				x	x	x			x	x	x
Ormosia sp. (NMV sp. 5)	Cshr	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Oropeza sp. 1	Shr												x					
Oropeza sp. 2	Shr		x		x	x	x	x							x	x		
Tipula sp. 1	Cg					x		x										x
Tipula sp. 2	Pred	x	x		x	x	x	x			x	x	x	x	x	x	x	x
Tipulidae sp. 1	Cg									x			x					
Tipulidae sp. 2	Pred						x	x										
Tipulidae sp. 3	Cg															x	x	x
Psychodidae																		
Maruina sp.	Cscr			x		x						x	x			x		x
Psychoda sp. (NMV sp. 3)	Cg	x	x		x	x	x	x	x	x	x	x	x		x	x	x	
Dixidae																		
Dixa sp. (NMV sp. 1)	Cg				x	x	x			x	x	x		x	x	x		x
Culicidae																		
Aedes sp. 1	Cf	x		x	x	x			x	x	x			x	x	x		x
Aedes sp. 2	Cf	x			x	x			x	x	x			x	x	x		
Anopheles annulipes Walker	Cf	x		x	x					x		x		x	x	x		
Culex australicus Skuse	Cf	x		x					x	x					x	x		
C. annulirostris Skuse	Cf	x		x			x			x				x	x	x		
C. fatigans Weidmann	Cf				x					x	x			x	x	x		

Table 2 (continued)

Taxa	Functional Feeding Group	Werribee River							Lerderderg River									
		SC		WPS					FF					WR				
		'83 SW 54 P	'83 PS 75 R	'82 SW 58 P	'83 SW 74 P	'83 PS 89 P	'82 BS 28 R	'83 PS 88 R	'82 SW 58 P	'83 SW 75 P	'83 PS 92 P	'82 BS 36 R	'83 PS 92 R	'82 SW 58 P	'83 SW 77 P	'83 PS 93 P	'82 BS 36 R	'83 PS 92 R
Chironomidae																		
Tanypodinae																		
Tanypodinae sp.	Pred	x	x	x	x	x		x	x	x			x	x	x			
Ablabesmyia sp. 1																		
(NMV sp. 7E)	Pred	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Procladius sp.																		
(NMV sp. 66E)	Pred	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Pentaneura spp.																		
(nr NMV sp. 32E)	Pred	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Chironominae																		
Chironomus nr *februarius*																		
(NMV sp. 136E)	Cg	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x
Chironomus sp.		Cg			x		x	x			x							
Polypedilum nr *tonnoiri*																		
(MMBW sp. 7)	Cscr							x				x			x			
P. nr *praesiogaster*																		
(NMV sp. 150E)	Cscr		x										x		x			x
Riethia sp. (NMV sp. 5E)	Cg	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Cryptochironomus sp.																		
(NMV 13E)	Cg											x	x					
Chironominae sp.	Cg											x	x	x				x
Kiefferulus sp.	Cg			x				x										
Paratendipes sp.	Cg											x						
Stenochironomus sp.																		
(NMV sp. 3E)	Cg	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x
Tanytarsini																		
Tanytarsus sp. (NMV sp. 22E)	Cg	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Rheotanytarsus sp.																		
(NMV sp. 4E)	Cf												x					x
Stempellina nr *bausei*	Cg		x		x	x		x	x	x	x	x	x	x	x	x	x	x
nr *Monodiamesa* sp.	Cshr	x	x	x	x	x		x	x	x	x		x	x	x	x		x
Podonominae																		
Podonomopsis sp.																		
(NMV sp. 71E)	Cscr	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Podonomous sp.																		
(NMV sp. 112E)	Cscr	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Orthocladiinae																		
Eukiefferiella sp.																		
(nr NMV sp. 70E)	Cscr	x	x		x	x		x	x	x	x	x	x	x	x	x	x	x

Table 2 (continued)

Taxa	Functional Feeding Group	Werribee River							Lerderderg River									
		SC		WPS					FF					WR				
		'83 SW 54 P	'83 PS 75 R	'82 SW 58 P	'83 SW 74 P	'83 PS 89 P	'82 BS 28 R	'83 PS 88 R	'82 SW 58 P	'83 SW 75 P	'83 PS 92 P	'82 BS 36 R	'83 PS 92 R	'82 SW 58 P	'83 SW 77 P	'83 PS 93 P	'82 BS 36 R	'83 PS 92 R
Cricotopus complex (includes NMV spp. 160E, 12E)[6]	Cscr	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
nr *Brillia* sp. 1	Cg	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x
nr *Brillia* sp. 2	Cg	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x
Heterotrissocladius sp.	Cg	x	x	x	x	x	x	x	x	x	x		x		x	x	x	x
Corynoneura sp.	Cscr								x	x						x		
Stictocladius sp. 1 (NMV sp. 9E)	Cscr		x			x	x	x		x	x	x	x			x	x	x
nr *Cordites* sp.	Cscr	x	x		x		x	x		x	x	x	x		x	x		x
Rheocricotopus sp. (NMV sp. 91E)	Cg								x	x					x			
Thienemanniella sp. (NMV sp. 10E)	Cg						x											
Orthocladiinae sp. 1	Cscr	x	x		x	x	x	x		x	x			x	x	x		
Orthocladiinae sp. 2	Cscr	x															x	x
Orthocladiinae sp. 3	Cscr		x															
Orthocladiinae sp. 4	Cscr																x	
Orthocladiinae sp. 5	Cscr		x						x									
Orthocladiinae sp. 6 (NMV sp. 34E)	Cg			x	x	x	x		x	x	x	x		x	x	x		
Aphroteniinae																		
Aphroteniella sp.(nr NMV sp. 18E)	Pred									x	x	x	x	x	x	x	x	x
Ceratopogonidae																		
Atrichopogon sp.	Cscr	x	x		x	x		x							x			x
Bezzia sp.	Pred	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
Culicoides sp. 1	Pred	x	x			x		x										
Culicoides sp. 2	Pred							x										
Dasyhelea sp.	Cg		x	x	x	x	x	x		x			x			x		x
Forcipomyia sp.	Cscr	x	x	x	x			x	x	x	x		x					
Monohelea sp.	Pred		x	x	x	x	x	x						x	x		x	
Nilobezzia sp.	Pred		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Simuliidae																		
All taxa listed below were "lumped" in this study																		
Austrosimulium furiosum (Skuse)																		
A. victoriae (Roubaud)																		
Austrosimulium nr sp. Y[7]																		
Austrosimulium sp. (nr *victoriae*)																		
?"*Cnephia*" *umbratorum*[8]	Cf	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x
Thaumaleidae																		
Thaumaleidae sp.	Scr			x	x	x			x	x								x

Table 2 (continued)

Taxa	Functional Feeding Group	Werribee River							Lerderderg River									
		SC		WPS					FF					WR				
		'83 SW 54 P	'83 PS 75 R	'82 SW 58 P	'83 SW 74 P	'83 PS 89 P	'82 BS 28 R	'83 PS 88 R	'82 SW 58 P	'83 SW 75 P	'83 PS 92 P	'82 BS 36 R	'83 PS 92 R	'82 SW 58 P	'83 SW 77 P	'83 PS 93 P	'82 BS 36 R	'83 PS 92 R
Tabanidae																		
Tabanidae sp. 1	Pred											x	x					x
Tabanidae sp. 2	Pred											x					x	
Stratiomyidae																		
Stratiomyidae spp.	Cg	x	x		x	x	x	x		x		x	x		x	x		x
Empididae																		
Empididae sp. 1	Pred	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Empididae sp. 2	Pred	x	x		x		x	x	x	x	x	x	x	x	x	x	x	x
Dolichopodidae																		
Dolichopodidae sp.	Pred	x	x		x	x		x		x			x	x	x	x		x
Sciomyzidae																		
Sciomyzidae sp.	Pred			x		x									x			
Ephydridae																		
Ephydridae sp.	Cg						x											
Muscidae																		
Muscidae sp. 1	Pred	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Muscidae sp. 2	Pred					x	x	x	x	x	x				x	x		x
Muscidae sp. 3	Pred	x	x		x	x	x	x	x	x	x	x	x	x	x	x		x
Trichoptera																		
Hydrobiosidae																		
Apsilochorema gisbum (Mosely)	Pred		x		x			x			x		x			x		x
A. obliquum (Mosely)	Pred								x		x	x	x			x	x	x
Ptychobiosis nigrita (Banks)	Pred									x	x	x	x		x	x	x	x
Taschorema sp. (?*evansi*)	Pred		x		x	x	x	x		x	x	x	x			x	x	x
Glossosomatidae																		
Agapetus spp. (includes sp. 7[9])	Scr		x				x	x		x	x	x	x		x	x	x	x
Hydroptilidae																		
Hellyethira ?*simplex* (Mosely)	Scr	x	x	x	x	x	x	x		x	x	x	x	x	x	x		x
Maydenoptila sp.	Scr	x			x	x		x										
Oxyethira columba (Neboiss)	Scr					x		x										
Philopotamidae																		
Hydrobiosella sp.	Cf												x					
Hydropsychidae																		
Cheumatopsyche sp. 3[9]	Cf										x							
Polycentropodidae																		
Plectrocnemia sp.	Pred					x						x					x	
Ecnomidae																		
Ecnomus rusellius Neboiss	Pred				x			x		x	x				x	x		x
Limnephilidae																		
?*Archaeophylax* sp.	Shr				x						x		x		x	x		x
Conoesucidae																		
Conoesucidae sp.	Un																x	x

Table 2 (continued)

Taxa	Functional Feeding Group	Werribee River							Lerderderg River									
		SC		WPS					FF					WR				
		'83 SW 54 P	'83 PS 75 R	'82 SW 58 P	'83 SW 74 P	'83 PS 89 P	'82 BS 28 R	'83 PS 88 R	'82 SW 58 P	'83 SW 75 P	'83 PS 92 P	'82 BS 36 R	'83 PS 92 R	'82 SW 58 P	'83 SW 77 P	'83 PS 93 P	'82 BS 36 R	'83 PS 92 R
Calocidae																		
Coenota plicata Mosely	Shr									x	x		x			x		x
Calocidae sp. 1	Shr					x			x	x	x	x	x	x	x	x	x	x
Atriplectididae																		
Atriplectides dubius Mosely	Cg										x	x		x				x
Philorheithridae																		
Austrheithrus sp.	Pred											x					x	
Helicopsychidae																		
?*Helicopsyche* sp.	Scr			x			x		x	x	x	x	x	x	x	x	x	x
Calamoceratidae																		
Anisocentropus sp.	Shr													x				
Leptoceridae																		
Leptorussa darlingtoni (Banks)	Cscr	x		x					x	x	x		x	x	x	x	x	x
Oecetis sp.	Pred	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Triaenodes sp.																		
(NMV sp. PT773)	Shr			x	x	x	x	x										
Lectrides varians Mosely	Shr			x					x	x	x			x	x	x		
Notalina bifaria Neboiss	Cshr				x												x	
N. spira St Clair	Cshr					x												x
Triplectides ciuskus ciuskus																		
Mosely	Shr			x					x	x	x		x	x	x	x		x
T. similis Mosely	Shr			x	x		x		x	x	x		x	x	x	x	x	x
T. truncatus Neboiss	Shr								x	x	x	x		x	x	x	x	x
Lepidoptera																		
Pyralidae sp.	Shr	x	x	x	x	x				x								x

[1] Dr P.J. Suter (pers. comm. 17.7.85) believes that the species of *Atalophlebia* and the species of *Nousia* is probably new because the adult genitalia are quite distinctive. They most resemble those named species in parentheses. *N. inconspicua* is now named *Koorrnonga inconspicua* (Dr R. Marchant, pers. comm. 18.4.91).

[2] Mr G. Theischinger (pers. comm. 14.5.85) identified these specimens as *Illiesoperla (Illiesoperla) mayi* (Perkins), a species earlier synonymized with *I. australis* by Hynes (1974). Theischinger (1982) reinstated *I. mayi* as a species clearly distinct from *I. australis* and illustrated some of the larval features (Theischinger 1984) associated with the adult after breeding out. The validity of the specific status of *I. mayi* is in doubt (C. M. Yule, pers. comm.) and a conservative approach, retaining the original name *Illiesoperla australis*, has been adopted here.

[3] Of the four species that comprise this complex (Hynes 1978), only *Riekoperla williamsi* McLellan occurred in collections of adults examined by Mr G. Theischinger (pers. comm., 14.5.85). Other adults, that could not be matched with nymphs, were *R. naso* Theischinger and *R. triloba triloba* McLellan and it is likely that the nymphs of these species were included in counts of nymphs assigned to the *R. karki-reticulata* complex. Difficulty was encountered separating some *R. rugosa* nymphs from those of the *R. karki-reticulata* complex. These may have been the nymphs of *R. naso*, a species found co-occurring with the closely related *R. rugosa* for the first time in Australia in this study (G. Theischinger pers. comm. 14.5.85).

[4] Ms C.M. Yule (pers. comm. 18.2.84) states that this is the correct name for adults and nymphs previously assigned to *Trinotoperla yeoi* Perkins.

[5] Unless otherwise indicated, all these beetles were adults.

[6] The *Cricotopus* complex is made up of at least seven different chironomid species whose characteristics are difficult to distinguish, especially when the mouth-parts are worn. As they all appear to share a similar diet, they have been lumped in this study.

[7] *Austrosimulium* nr sp. Y follows the name used in Ms J. Prince's collection.

[8] *"Cnephia"* definitely is not in the genus *Cnephia* although that is the name currently used (Ms J. Prince pers. comm. 7.8.84).

[9] These numbers refer to the voucher specimens held in the MMBW collection of Mr J. Dean and Mr D. Cartwright.

Table 3. Numbers and percentage composition of aquatic macroinvertebrate taxa in major groups collected from pools and riffles at four study sites on the Werribee and Lerderderg Rivers in 1982–1984.

Taxon	Total	Percentage
Mollusca	6	2.32
Other non-arthropods	7	2.71
Crustacea	9	3.49
Arachnida	17	6.59
Ephemeroptera	5	1.94
Odonata	5	1.94
Plecoptera	15	5.81
Hemiptera	9	3.49
Coleoptera	64	24.81
Non-chironomid Diptera	52	20.16
Chironomidae	37	14.34
Trichoptera	29	11.24
Other insects	3	1.16
Total	258	

Table 4. Numbers and percentage composition of taxa in several functional feeding groups.

Taxon	Total	Percentage
Predators	101	39.15
Collector-scrapers	49	18.99
Collector-gatherers	43	16.67
Scrapers	17	6.59
Shredders	17	6.59
Collectors-filterers	15	5.81
Collector-shredders	12	4.65
Others	4	1.55

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Plecoptera, Ephemeroptera and Trichoptera of the Pelion Valley, Tasmanian World Heritage Area

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Abstract. Dean, J.C. and Cartwright, D.I. 1992. Plecoptera, Ephemeroptera and Trichoptera of the Pelion Valley, Tasmanian World Heritage Area. *Occasional Papers from the Museum of Victoria* 5: 73–79.

A survey of the Pelion Valley yielded eighty species of aquatic insects, consisting of seventeen species of stoneflies, thirteen species of mayflies and fifty species of caddisflies. Most species featured orderly distribution patterns along the river continuum, and several examples of spatial separation of congeners are reported. There was an obvious trend of increasing species richness as one moved from small headwater streams to larger downstream sites. The Lake Ayr outlet stream was unique in yielding a number of species which are widely distributed at lower altitudes, and their presence in the study area can probably be attributed to benign physical conditions at that site. There was no evidence of endemism among the aquatic insects we collected. With a single exception, there are extensive records from elsewhere in Tasmania of all the species we have identified. The exception is the stonefly *Eusthenia reticulata*, which has seldom been collected and is apparently a rare species (Hynes, 1989). Its collection from Douglas Creek is significant. The status of species we are unable to identify is unknown. These include most of the mayflies and some caddisflies, and highlights the need for basic taxonomic investigations of these groups.

Introduction

Running water communities worldwide are usually dominated by aquatic insects. In terms of species richness and abundance, the Orders Plecoptera, Diptera, Ephemeroptera and Trichoptera are prominent. This report presents the results of a survey of three of these: Orders Plecoptera (stoneflies), Ephemeroptera (mayflies) and Trichoptera (caddisflies), in the Mount Ossa - Pelion Valley area of the Cradle Mountain - Lake St Clair National Park.

Cradle Mountain - Lake St Clair National Park is an extensive reserve which forms the northern boundary of the Tasmanian World Heritage Area. Access to most of the country within the Park is relatively difficult, and the area has not previously been surveyed for aquatic insects. Neboiss et al. (1988) have reported on the caddisflies of the extreme northern and southern ends of the Park, but pointed out that "the greatest and most exciting part of the Park from Cradle Mountain to Lake St Clair still remains unexplored as far as the aquatic insects (Trichoptera) are concerned". Limited collections of Plecoptera and Ephemeroptera have also been made in accessible parts of the Park, especially near Cradle Mountain. These collections have been far from comprehensive, and have only been reported as locality records for a few species in the taxonomic literature.

The results presented below are based on a series of samples collected in mid-January 1990. Limited time was available for sampling at each location and, although taxa lists are extensive, it is likely that they include only the more common species from the survey area. In addition, species with life histories characterised by an absence of nymphs or larvae from streams in summer are unlikely to have been collected.

Methods

Sampling

Samples were collected from seventeen locations (Figure 1). With the exceptions of sites 1 and 6, these were all running water sites, ranging from first order headwater streams to larger third order streams (see Appendix).

Aquatic stages were primarily collected using a kick sampling technique. Bottom sediments were vigorously disturbed, either by foot or by overturning larger rocks and woody substrates. The dislodged fine material was collected in a downstream pond net, transferred to a large white tray, and individual insects picked from the debris using forceps. Larvae and pupae were also handpicked directly from the surfaces of larger rocks and solid substrates.

Adults were collected by sweeping riparian vegetation with hand nets. Battery operated light traps were employed after dark, although with limited success.

Taxonomy

The Tasmanian stoneflies are taxonomically well known. Material collected during the present study has been identified using keys to adults and nymphs (Hynes, 1989).

By contrast, the taxonomy of Tasmanian mayflies is very incomplete. Adults of fifteen species have been described from the state (Tillyard, 1936; Harker, 1954, 1957), but descriptions of many of these are inadequate for identification of collected material. This problem is compounded by the presence of an unknown number of undescribed species. Although taxonomy of the nymphs is an even more parlous state, we have concentrated our efforts on this stage. All specimens have been identified to genus using the keys of Suter (1979) and Dean (1989), and we have allocated voucher numbers to distinguish presumptive species. A voucher collection has been maintained for several years in Victoria, and the Tasmanian material has now been incorporated into this. Formal identification must, however, await a revision of the adults and the rearing of nymphs.

While adult taxonomy of the Tasmanian Trichoptera is well advanced, primarily due to the efforts of Neboiss (1977, 1986), little published information is available on immature stages. Despite this, we have been able to identify most of the larvae collected. Over the past ten years, we have accumulated a large amount of larval and reared material from both Tasmania and the mainland, and this unpublished information has been augmented with reared material collected during the present study. Larval taxonomy of the families Conoesucidae, Calocidae and Helicophidae is currently being investigated by Jean Jackson at the University of Tasmania, and she has kindly identified some of our material in these families.

Distribution and abundance

Included in the species lists are assessments of the distribution and abundance of each taxa. These assessments are based solely on the set of samples which we have collected, and give an indication of relative rather than absolute abundance. The status of individual taxa would be likely to change if sampling intensity was increased, or if samples were collected at other times of the year. Categories we have adopted are:

Restricted distribution: recorded from 1 or 2 sites only.
Limited distribution: recorded from 3 or 4 sites.
Widespread distribution: recorded from 5 or more sites.

Rare species: a total of 1-3 specimens collected from all sites.
Common species: a total of 4-30 specimens collected from all sites.
Abundant species: more than 30 specimens collected from all sites.

Results and Discussion

Plecoptera (stoneflies)

The species. — At least seventeen stonefly species were recorded from the study area (Table 1). While most of the material consisted of nymphs, adults of eleven species were also collected, allowing confirmation of nymphal identifications.

Species richness ranged from 1 to 7 at the running water sites, but there was no obvious relationship between numbers of species and stream size. Similarly, there were few well defined patterns of distribution. Several species were widely distributed (e.g., *Eusthenia costalis*, *Tasmanoperla thalia* and *Crypturoperla paradoxa*), but the majority were sporadic in occurrence, with at least eleven species recorded from only 1 or 2 sites. This makes it difficult to draw conclusions about general distribution.

Notes on selected taxa. — *Eusthenia reticulata*. This species is apparently rare. Hynes (1989) comments that it has only been collected once in recent years, from a high stream on Mount McCall. The nymph is unknown, although possible nymphs from Mount McCall are grouped with two additional species as the *Eusthenia spectabilis* group in the key of Hynes (1989). In the present study a single female was collected from site 4, while four nymphs of the *E. spectabilis* group listed in Table 1 may be nymphs of *E. reticulata*.

Leptoperla beroe. A single male of this species was collected from the shore of Lake Ayr: the nymphs probably occur in the lake, but this has not been confirmed.

Cardioperla nigrifrons. Large numbers of nymphs of this species were collected from moss in swift water on the 45° face of a waterfall at site 12.

Cardioperla sp. A. A single, very early nymph of a third species of *Cardioperla* was collected from site 5. This nymph had a very strong dorsal ridge on the abdominal terga, but was too small for positive identification. Sampling at other times of the year may yield additional specimens.

Genus *Austrocercoides*. Nymphs of the two known Tasmanian species cannot be distinguished. Adults of *A. zwicki* emerge in spring-early summer, while *A. bullata* adults have been collected from January to April (Hynes, 1989). In the present study adults of *A. bullata* were collected from site 4, while fully developed nymphs from sites 4 and 7 were probably the same species. Nymphs less than half grown were collected from sites 8, 14, 15 and 16, and these could conceivably be *A. zwicki*.

Ephemeroptera (mayflies)

The species. — Thirteen mayfly species were collected, all but three belonging to the family Leptophlebiidae (Table 2). At least four, and perhaps as many as ten of these species are undescribed, reflecting the great need for taxonomic study of Tasmanian Ephemeroptera.

Distribution patterns. — Arrangement of the running water sites in order of increasing size highlights the fact that most species featured orderly, well defined patterns of distribution (Table 3). *Ameletoides* sp. was widely distributed in fast flowing habitats of moderate size streams, while *Tasmanophlebia lacustris* avoids currents and was only collected from Lake Ayr and those few running water sites with pools and areas of slow current (sites 2, 4 and 14). Within the genus *Nousia*, *Nousia* sp. 7 was extremely widespread and recorded from most stream sites, *Nousia* sp. 6 was restricted to intermediate size tributary streams in heavy forest, while *Nousia* sp. 5 and *Nousia* sp. 9 were only recorded from larger downstream sites. *Nousia* sp. 8 was restricted to flowing water sites above and below Lake Ayr. The two species of *Austrophlebioides* were also spatially separated. *Austrophlebioides* sp. 4 was restricted to open sites on the Pelion Plain, while *Austrophlebioides* sp. 5 was only recorded from heavily forested sites further upstream.

There was an obvious tendency for species richness to increase as stream size increased (Table 3). The number of species at individual sites ranged from one at site 8 (a small headwater stream) to seven species at the furthest downstream site (site 17).

Notes on selected taxa. — *Ameletoides* sp. This genus was first recorded from Tasmania by Campbell (1981), who collected nymphs from Pencil Pine River near Cradle Mountain. He suggested that they may have been an undescribed species, and comparison of nymphs collected in the present study with specimens from the Victorian Alps supports this suggestion.

Atalophlebia albiterminata. This species is common throughout much of Tasmania (Tillyard, 1936). In the present study it was only collected from the Lake Ayr outlet stream, 100 metres downstream from the lake. Its presence at this site may be a consequence of a reduced flow and stable substrate, or perhaps is due to slightly elevated temperatures.

Genus *Nousia*. With six species, the genus *Nousia* is extremely diverse in the study area. This diversity is apparently facilitated by spatial separation of nymphs. Four species in the genus have previously been described from Tasmania, three of them only from lowland localities. Identification of the Pelion material is not possible at present, despite the collection of adults of several of the species.

Genus D sp. *tristis*. This species was described by Harker (1954) (as *Jappa tristis*), the type material having been collected by Tillyard in 1917 from Cradle Mountain. In a guide to Australian Leptophlebiidae, Dean (1989) established "Genus D" to accomodate several undescribed species from south-eastern Australia. Examination of nymphs and an adult male from Pelion Valley confirms that the species *tristis* belongs to this undescribed genus. The genus *Jappa* is therefore removed from the Tasmanian fauna.

Genus *Austrophlebioides*. This is the first record of this genus from Tasmania, and both species are undescribed. *Austrophlebioides* sp. 5 is characterised by a striking modification of the labrum. The fringes of setae on the anterior margin have been formed into a "suction disc" which perhaps assists the nymph when clinging to rock surfaces in fast currents. In all other aspects the nymph agrees with typical *Austrophlebioides* nymphs.

Trichoptera (caddisflies)

The species. — At least fifty species of caddisflies were recorded from the study area (Table 4). The dominant families were Hydrobiosidae (14 species), Leptoceridae (8 species), Conoesucidae (5 species) and Philorheithridae (4 species). Of the fifty species, 38 were collected as either adults or larvae which have been reared to adults, and could be identified to the species level.

Distribution patterns. — Distributions of those species which were recorded from more than one site are presented in Table 5. As with the mayflies, there was a general tendency for species richness to increase with increasing stream size.

Most of the running water species featured distribution patterns which were orderly with respect to position along the river continuum. For example, *Diplectrona* sp. was limited to small-medium size forest streams, *Hydrobiosella cognata*, *Archaeophylax ochreus*, *Caenota plicata* and *Tasmanthrus galbinomaculatus* were restricted to medium size streams but extended further downstream than *Diplectrona* sp., while *Apsilochorema obliquum*, *Taschorema asmanum* and *Conoesucus digitiferus* ranged from medium size forest streams to the furthest downstream sites, and *Taschorema viridarium*, *Hydrobiosella waddama* and *Plectrocnemia* sp. were restricted to the larger downstream sites.

Taschorema evansi, *Helicopsyche* sp. and *Tamasia variegata* were only recorded from the Lake Ayr outlet stream. In addition, *Asmicridea edwardsi* may be restricted to the outlet stream, as the only other record (site 4) was a single adult male which may have flown downstream from site 3. All of these species are widely distributed at lower altitudes, and physical conditions unique to site 3 probably explains their presence in the study area.

The leptocerid *Triplectidina nigricornis* was only recorded from site 6, which consisted of a series of small isolated pools on Pelion Plain, and was the only species of caddisfly collected from these pools.

Spatial separation of congeners was a striking feature of the genera *Tasmanthrus* and *Hydrobiosella*. *Hydrobiosella waddama* was only recorded from open sites on the Pelion Plain, whereas *H. cognata* appears to be restricted to forest sites further upstream. A single adult male of *H. cognata* collected at site 17 probably flew down from an upstream site. Similarly, *Tasmanthrus angustipennis* was restricted to the three sites downstream from Lake Ayr, while *T. galbinomaculatus* was recorded from upstream forested sites.

Notes on selected taxa. — *Moruya* sp. Larvae of the genus *Moruya* were collected from many sites, but we are unable to identify them to species. At least some specimens are probably *M.charadra*, adults of which were collected from site 17, but it is likely an additional species is also represented in the samples.

Hydrobiosidae: larval species A, B and C. These species were each recorded from a single site, and only one or two specimens were collected. It is likely that at least two of them are species of *Austrochorema*, while a third may be *Ipsebiosis*. Until adults have been reared, they must remain unidentified.

Genus *Tasmanthrus*. Male pupae and associated larval sclerites were collected, as well as numerous larvae, of two distinctive species of *Tasmanthrus*. One species is clearly *T. angustipennis*, while the male genitalia of the second species agrees with *T.galbinomaculatus* described from Cradle Mountain by Jacquemart (1965). Neboiss (1977) has placed the latter species as a synonym of *T.angustipennis*, but this decision will probably have to be reversed.

General comments

The present survey has yielded 80 species of aquatic insects, consisting of 17 species of stoneflies, 13 species of mayflies and 50 species of caddisflies. Species richness varied considerably between individual sites. At running water sites total numbers of species ranged from eight (site 9) to 28 (site 17), with an obvious trend of increasing richness as one moved from small headwater streams to larger downstream sites.

We found no evidence of endemism in the aquatic insects of Pelion Valley. While the Tasmanian mayflies are poorly known, and as a consequence we are unable to assess the wider distribution of the species we collected, Tasmanian stoneflies and caddisflies have been extensively surveyed in recent years. With the exception of *Eusthenia reticulata*, all the stonefly species from Pelion Valley are widely distributed in Tasmania (Hynes, 1989). *E. reticulata* is a species which has rarely been collected, and its presence in Douglas Creek is of significance. Similarly, the caddisfly species which we have identified are well known from elsewhere in the state (Neboiss et al., 1988). The twelve taxa which we are unable to identify were all collected as larvae only, and there is no reason to suggest that any of these are endemic or rare when none of the 38 species which we were able to identify fall into either of these categories.

The survey has highlighted deficiencies in the taxonomy of adults and nymphs of Tasmanian mayflies, and the larval taxonomy of some of the caddisflies. Aquatic insect communities are valuable indicators of general environmental quality, and are responsive to catchment disturbance and changes in such factors as hydrology, temperature and siltation. However, if they are to be fully utilised in environmental monitoring programs, it is important that basic taxonomic information is available, especially for immature stages.

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Table 1. Plecoptera (stoneflies) of Pelion Valley

	Abundance/distribution	Sites
EUSTHENIIDAE		
Eusthenia costalis	Abundant, widespread	7-11, 13-17
E. reticulata (A)	Rare, restricted	4
E. spectabilis group (N)	Common, restricted	3, 11
AUSTROPERLIDAE		
Tasmanoperla thalia	Abundant, widespread	7,8,10,11,13-16
Crypturoperla paradoxa	Abundant, widespread	8-15
GRIPOPTERYGIDAE		
Leptoperla varia	Common, restricted	2
L. beroe	Rare, restricted	1
Cardioperla nigrifrons	Common, limited	8, 10-12
C. falsa	Common, restricted	10
C. sp. A	Rare, restricted	5
Dinotoperla serricauda	Rare, restricted	17
Trinotoperla zwicki	Common, limited	7, 10, 11, 17
T. tasmanica	Rare, restricted	11
NOTONEMOURIDAE		
Notonemoura lynchi	Rare, restricted	8, 16
Austrocerca tasmanica	Rare, restricted	1
A. rieki	Rare, restricted	2, 3
Austrocercella christinae	Rare, restricted	9
Austrocercoides bullata (A)	Rare, restricted	4
A. sp. (N)	Common, widespread	4, 7, 8, 14-16

A = adults, N = nymphs

Table 2. Ephemeroptera (mayflies) of Pelion Valley

	Adundance/distribution	Sites
SIPHLONURIDAE		
Ameletoides sp.	Common, widespread	4,7,9-11,14,15
ONISCIGASTRIDAE		
Tasmanophlebia lacustris	Common, limited	1,2,4,14
BAETIDAE		
Baetis sp. A	Common, restricted	5,17
LEPTOPHLEBIIDAE		
Atalophlebia albiterminata	Rare, restricted	3
Nousia sp.5	Abundant, widespread	4,7,14,15,17
Nousia sp.6	Common, widespread	9-11, 15, 16
Nousia sp.7	Abundant, widespread	2,4,7-11,13-17
Nousia sp.8	Common, limited	2,3,5,17
Nousia sp.9	Common, limited	7,14,17
Nousia sp.10	Rare, restricted	13
Genus D sp. *tristis*	Abundant, widespread	4,7,11,14,15,17
Austrophlebioides sp.4	Common, restricted	5,17
Austrophlebioides sp.5	Common, limited	7,10,11,15

TABLE 3 Distribution of mayfly species, Pelion Valley

	Running water sites increasing catchment size →												Lake outlet sites		Moss face of waterfall	Standing waters	
	2	8	13	9	16	10	15	11	14	7	4	17	5	3	12	1	6
Ameletoides sp.				X		X	X	X	X	X	X						
Tasmanophlebia lacustris	X								X		X					X	
Baetis sp.												X	X				
Atalophlebia albiterminata														X			
Nousia sp. 5							X		X	X	X	X					
Nousia sp. 6				X	X	X	X	X									
Nousia sp. 7	X	X	X	X	X	X	X	X	X	X	X	X					
Nousia sp. 8	X											X	X	X			
Nousia sp. 9									X	X		X					
Nousia sp. 10			X														
Genus D sp. *tristis*							X	X	X	X	X	X					
Austrophlebioides sp. 4												X	X				
Austrophlebioides sp. 5						X	X	X		X							
Number of species	3	1	2	3	2	4	6	5	6	6	5	7	3	2	-	1	-

Table 4. Trichoptera (caddisflies) of Pelion Valley

	Abundance/distribution	Sites
HYDROBIOSIDAE		
Apsilochorema obliquum	Abundant, widespread	4,5,7,10,14,15,17
Austrochorema pegidion	Common, limited	7,8,10,13
Ulmerochorema sp.	Common, limited	4,5,7,17
Ethochorema nesydrion	Abundant, widespread	4,7,10,11,14-17
Ethochorema kelion	Rare, restricted	15
Taschorema asmanum	Abundant, widespread	4,5,7,12,14,15,17
Taschorema evansi	Common, restricted	3, 5
Taschorema viridarium	Common, restricted	4, 17
Ptychobiosis nigrita	Rare, restricted	15
Keotonga clivicola	Rare, restricted	14
Moruya charadra	Rare, restricted	17
Moruya sp.	Common, widespread	4,7,10,12,14,15,17
Unident. larva sp.A	Rare, restricted	2
Unident. larva sp.B	Rare, restricted	12
Unident. larva sp.C	Rare, restricted	12
GLOSSOSOMATIDAE		
Agapetus tasmanicus	Rare, restricted	5
PHILOPOTAMIDAE		
Hydrobiosella cognata	Abundant, widespread	7,9-17
Hydrobiosella waddama	Abundant, restricted	5,17
HYDROPSYCHIDAE		
Smicrophylax sp.	Abundant, restricted	17
Asmicridea edwardsi	Abundant, restricted	3,4
Diplectrona sp	Abundant, widespread	8,10,11,13,15,16
POLYCENTROPODIDAE		
Plectocnemia sp.	Rare, restricted	4,7
Tasmanoplegus spilota	Rare, restricted	2
Nyctiophylax repandus	Common, limited	7,14,17

Table 4 continued.

LIMNEPHILIDAE		
Archaeophylax ochreus	Common, widespread	7,10,11,13-16
PLECTROTARSIDAE		
Plectrotarsus tasmanicus	Common, restricted	1
TASIMIIDAE		
Tasimia sp.	Common, restricted	17
HELICOPSYCHIDAE		
Helicopsyche sp.	Common, restricted	3
CONOESUCIDAE		
Costora rotosca	Common, limited	3,11,17
Costora delora	Common, restricted	4,5
Conoesucus fromus	Common, limited	2,4,17
Conoesucus digitiferus	Abundant, widespread	3,4,7,10-12,17
Conoesucus nepotulus	Common, restricted	12,17
CALOCIDAE		
Caenota plicata	Common, widespread	3,4,7,9-11,15
Tamasia variegata	Common, restricted	3
HELICOPHIDAE		
Alloecella grisea	Rare, restricted	10
Alloecella longispina	Common, limited	7,8,12
Alloecella pilosa	Rare, restricted	12
PHILORHEITHRIDAE		
Aphilorheithrus stepheni	Rare, restricted	1, 4
Aphilorheithrus sp.A	Rare, restricted	14
Tasmanthrus angustipennis	Common, limited	3,5,17
T. galbinomaculatus	Abundant, widespread	4,7,10-12,14-16
LEPTOCERIDAE		
Triplectides similis	Rare, restricted	1
Triplectides bilobus	Abundant, widespread	4,7,11,13-17
Symphitoneuria opposita	Common, restricted	1
Triplectidina nigricornis	Common, restricted	6
Notalina parkeri	Rare, restricted	1
Notalina fulva	Common, restricted	1,4
Notalina sp.	Common, limited	1,3,5,17
Condocerus sp.	Common, restricted	2,14
Oecetis scirpicula	Rare, restricted	1

TABLE 5 Distribution of caddisfly species, Pelion Valley (Taxa recorded from only one locality not included)

	Running water sites increasing catchment size →												Lake outlet sites		Moss face of waterfall	Standing waters	
	2	8	13	9	16	10	15	11	14	7	4	17	5	3	12	1	6
Apsilochorema obliquum						X	X		X	X	X		X				
Austrochorema pegidion	X	X				X				X							
Ulmerochorema sp.										X	X	X	X				
Ethochorema nesydrion					X	X	X	X	X	X	X	X					
Taschorema asmanum							X		X	X	X	X	X		X		
Taschorema evansi													X	X			
Taschorema viridarium											X	X					
Moruya sp.						X	X		X	X	X	X			X		
Hydrobiosella cognata		X	X	X	X	X	X	X	X	X		X			X		

Table 5 continued.	2	8	13	9	16	10	15	11	14	7	4	17	5	3	12	1	6
Hydrobiosella waddama												X	X				
Asmicridea edwardsi											X			X			
Diplectrona sp.		X	X		X	X	X	X									
Plectrocnemia sp.										X	X						
Nyctiophylax repandus									X	X		X					
Archaeophylax ochreus			X		X	X	X	X	X	X							
Costora rotosca								X				X	X				
Costora delora											X		X				
Conoesucus fromus	X										X	X					
Conoesucus digitiferus						X		X		X	X	X		X	X		
Conoesucus nepotulus												X			X		
Caenota plicata				X		X	X	X		X	X			X			
Alloecella longispina		X							X					X			
Tasmanthrus angustipennis												X	X	X			
Tasmanthrus galbinomaculatus					X	X	X	X	X	X	X				X		
Triplectides bilobus			X		X		X	X	X	X	X	X					
Notalina sp.												X	X	X		X	
Condocerus sp.	X								X								
Total number of species	4	3	5	3	6	11	12	9	12	16	16	18	9	9	10	7	1

Appendix. Details of sampling locations.

Site 1 D. Cartwright and J. Dean, 16 January 1990, Tas., Lake Ayr, 8114.214695

Site 2 J. Dean and D. Cartwright, 16 January 1990, Tas., Small trickle flowing into Lake Ayr, 8114.214695

Site 3 D. Cartwright and J. Dean, 16 January 1990, Tas., Lake Ayr outlet stream, approx. 100 metres d/s Lake Ayr, 8114.211695

Site 4 J. Dean and D. Cartwright, 16 January 1990, Tas., Douglas Creek, upstream of confluence with Lake Ayr outlet stream, 8114.206691

Site 5 D. Cartwright and J. Dean, 16 January 1990, Tas., Lake Ayr outlet stream, upstream of confluence with Douglas Creek, 8114.205692

Site 6 J. Dean and D. Cartwright, 16 January 1990, Tas., Isolated pools, Pelion Plains, 8114.207692

Site 7 D. Cartwright and J. Dean, 16 January 1990, Tas., Douglas Creek, Pelion Rangers Hut, 8114.208683

Site 8 J. Dean and D. Cartwright, 17 January 1990, Tas., Headwater stream, 100 metres North of Pelion Gap, 8114.217649

Site 9 D. Cartwright and J. Dean, 17 January 1990, Tas., Unnamed creek, approx. 3/4 km, NW of Pelion Gap, 8114.211654

Site 10 J. Dean and D. Cartwright, 17 January 1990, Tas., Unnamed creek, approx. 1 1/2 km, NW of Pelion Gap, 8114.209661

Site 11 D. Cartwright and J. Dean, 17 January 1990, Tas., Sharers Hut Creek, approx., 2 1/2 km NW of Pelion Gap, 8114.208668

Site 12 J. Dean and D. Cartwright, 17 January 1990, Tas., Douglas Creek, approx., 2 1/2 km NW of Pelion Gap, 8114.208669

Site 13 D. Cartwright and J. Dean, 17 January 1990, Tas.,, Unnamed creek, approx., 2 3/4 km NW of Pelion Gap, 8114.207673

Site 14 J. Dean and D. Cartwright, 18 January 1990, Tas., River Forth, Frog Flats, 8114.172674

Site 15 D. Cartwright and J. Dean, 18 January 1990, Tas., Unnamed creek, approx., 1/4 km E of Frog Flats, 8114.176674

Site 16 J. Dean and D. Cartwright, 18 January 1990, Tas., Unnamed creek, approx., 3/4 km NE of Frog Flats, 8114.179678

Site 17 D. Cartwright and J. Dean, 18 January 1990, Tas., Douglas Creek, High Bridge, near old Pelion Hut, 8114.198690